June 1943

TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office

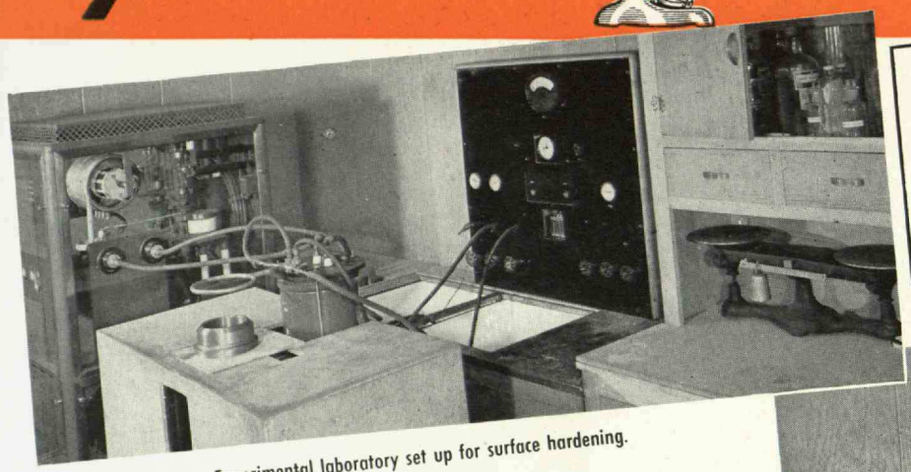


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Thermonic Laboratories

The Guarantee behind our Production Rate on Thermonic Induction Heating Equipment.



Experimental laboratory set up for surface hardening.



Examining micro-structure of hardened specimens in THERMONIC Laboratory.

For our customer's protection, every production rate, quoted in proposals on THERMONIC equipment, is backed up by thorough laboratory investigation.

IF YOU HAVE A BRAZING PROBLEM

This service includes the cross-sectioning of the joints following brazing to determine the alloy flow, and metallographic analysis to determine the effect of the heating on adjacent sections. Test runs are made on, not one but many samples to ascertain the adaptability of the process to production.

IF YOU HAVE A HARDENING PROBLEM

Hardness values are obtained and the hardenability determined by photomicrographic studies. Temperatures are carefully checked by pyrometric measurements.

Again, numerous samples are run, approaching pilot plant technique, to insure uniform results.

IF YOU HAVE AN ANNEALING PROBLEM

Photomicrograph and hardness values are taken as indications of the "before" and "after" physical characteristics, to insure meeting your requirements.

A TYPICAL EXAMPLE OF A HARDENING PROBLEM

Fig. 1



Fig. 2



Fig. 3

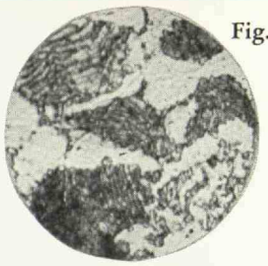
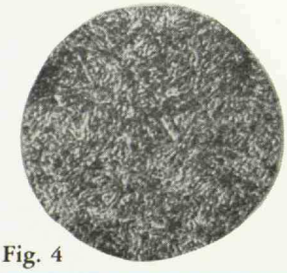


Fig. 4



PROBLEM:

To surface harden a machined ring, S.A.E. 1040 steel, hardness not to penetrate sufficiently to affect the area surrounding the drilled hole, which is subsequently tapped.

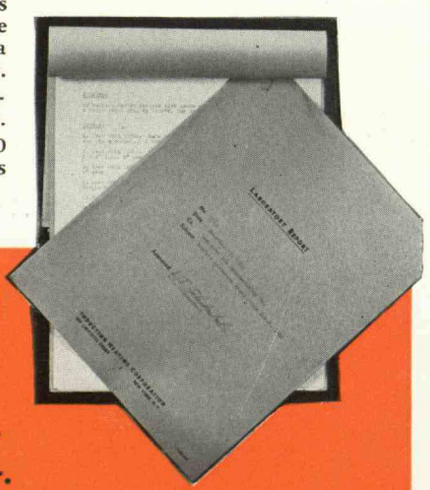
PROCEDURE:

Single turn coil, as illustrated in Fig. 1, heated the outer cylindrical surface of the ring to 1550° F. in 15 seconds, using a Model 1070 THERMONIC Induction Generator. Piece was water quenched, and resultant hardness of Rc 61 was obtained.

Fig. 2 shows an etched cross section. The depth of hardness, transition zone, and original structure are evident. It is clearly seen that the area surrounding the drilled hole remained soft, having only a portion of the transition zone adjacent to it.

Fig. 3 is a photomicrograph taken at 650 magnification of the original pearlitic structure.

Fig. 4 is a photomicrograph taken at 650 magnification on the hardened area; this being a typical martensitic structure.



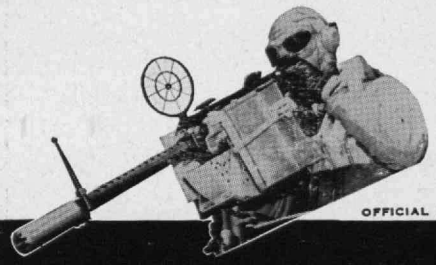
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Designers • Builders • Of Thermonic Heat Treating Equipment

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E. S. Goodridge, '33, Pres. **W. A. Gray, '33, Engr.**

Keep Your Workers' Eyes Trained on their Work



OFFICIAL NAVY PHOTOGRAPH

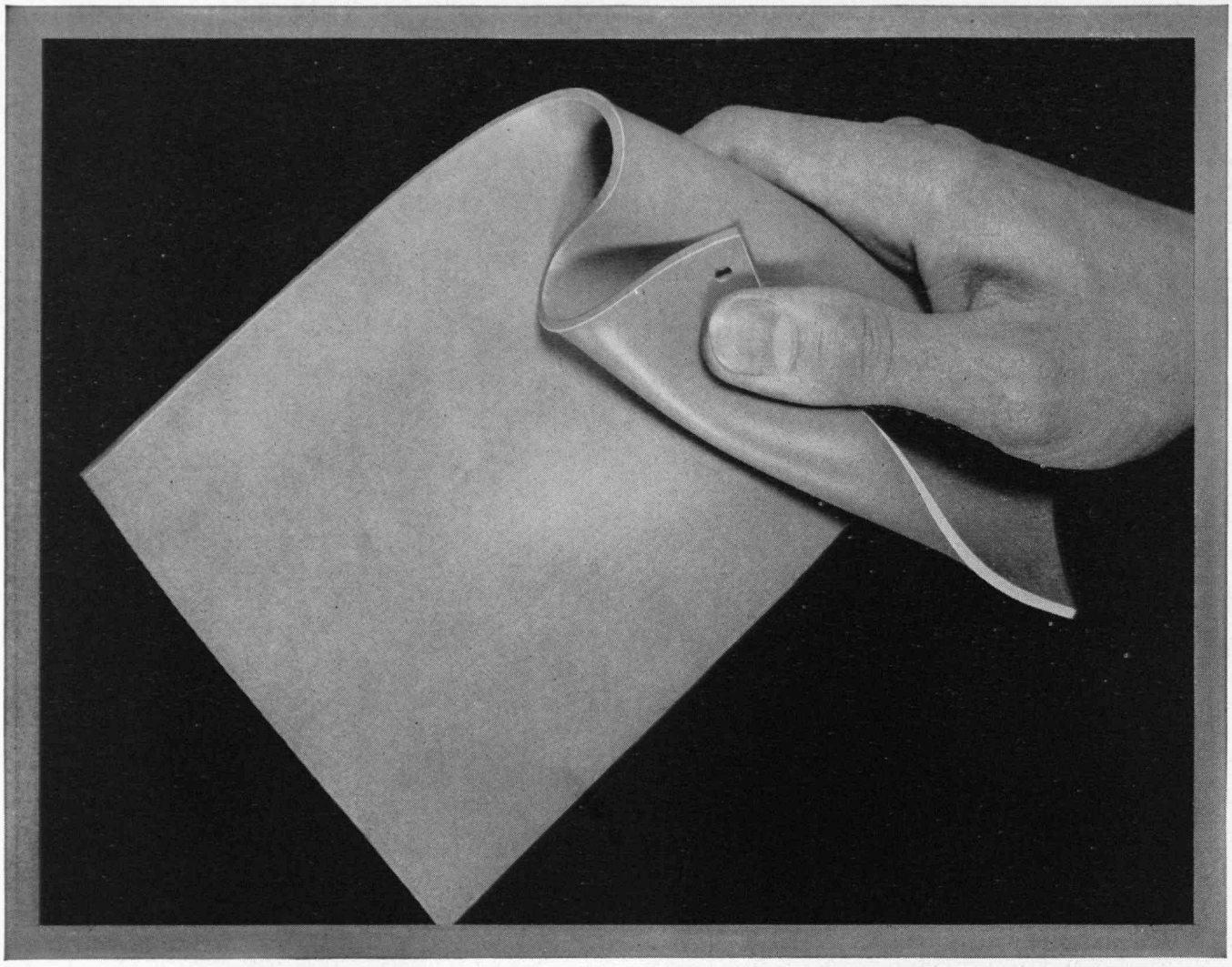
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OPTICAL
GOGGLES

We need more than our workers' hands to win this war . . . we also need their *eyes*. Yet, for lack of proper goggles, industrial eye accidents are *still* occurring at an alarming rate . . . *still* costing our valiant fighting men much equipment that they need to smash the enemy.

Put on an offensive now to stop eye accidents in *your* plant. American Optical Company, pioneer manufacturer of products to aid and preserve vision, offers you the eye protection equipment and complementary services that your plant needs to protect man-power for war-power. AO Goggles are scientifically designed to give maximum possible protection . . . and workers find them comfortable to wear. Have your Safety Director get in touch with the nearest American Optical Branch Office.

American Optical
COMPANY
SOUTHBRIDGE, MASSACHUSETTS

THE TECHNOLOGY REVIEW, June, 1943. Vol. XLV, No. 8. Published monthly from November to July inclusive at 10 Ferry Street, Concord, N. H. Publication date: twenty-seventh of the month preceding date of issue. Annual subscription $3.50; Canadian and Foreign subscription $4.00. Entered as second-class matter at the Post Office at Concord, N. H., under the Act of March 3, 1879.



TYGON LOOKS LIKE *Rubber* FEELS LIKE *Rubber*

.... FOR MANY USES IS BETTER THAN RUBBER!

TYGON might not make a good tire for your car, but that's one of the few places where this versatile, flexible plastic cannot act as a more than satisfactory replacement for rubber.

In hundreds of America's war plants, Tygon, pinch-hitting for rubber, is releasing tons of this critical material for work which rubber alone can do. For many of these applications, the superiority of Tygon has been so pronounced that it is unlikely rubber will ever again be used, even when freely available.

For example, Tygon lining materials have replaced rubber for tanks and other equipment in which corrosive acids are made and handled. Here Tygon's unique properties: its almost "universal" resistance to chemical attack, its remarkable durability, its immunity to the oxidizing elements that tend to destroy rubber, and the tenacity with which it can be bonded to steel without the necessity of vulcanizing or curing, have made most users of chemical equipment forget all about rubber.

Tygon flexible tubing has replaced rubber in laboratories, in hospitals, in industry, in fact wherever a highly flexible tubing is required. Resistant to acids, alkalies and oils, Tygon tubing offers the striking additional advantages of transparency or a broad range of color (both unavailable in rubber), transparency for clearly visible fluid transmission — color for ready identification of fluid lines.

Stoneware engineering research met the need for a replacement for molded rubber mechanical goods by perfecting molding techniques which permitted shaping, in standard rubber molds, of Tygon formulations, possessing not only the desirable physical attributes of rubber but the basic chemical inertness of sheet Tygon.

Possibly in your operations, too, there are places where Tygon may not only conserve precious material for war, but may prove of even greater worth than the material it replaces.

Would you like to learn more about Tygon? Write for Bulletin 1620-B. Address The U. S. Stoneware Company, Akron, Ohio. In Canada: Chamberlain Engineering, Ltd., Montreal.

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AKRON, OHIO

ENGINEERS • MANUFACTURERS • ERECTORS • *of* CORROSION-RESISTANT EQUIPMENT

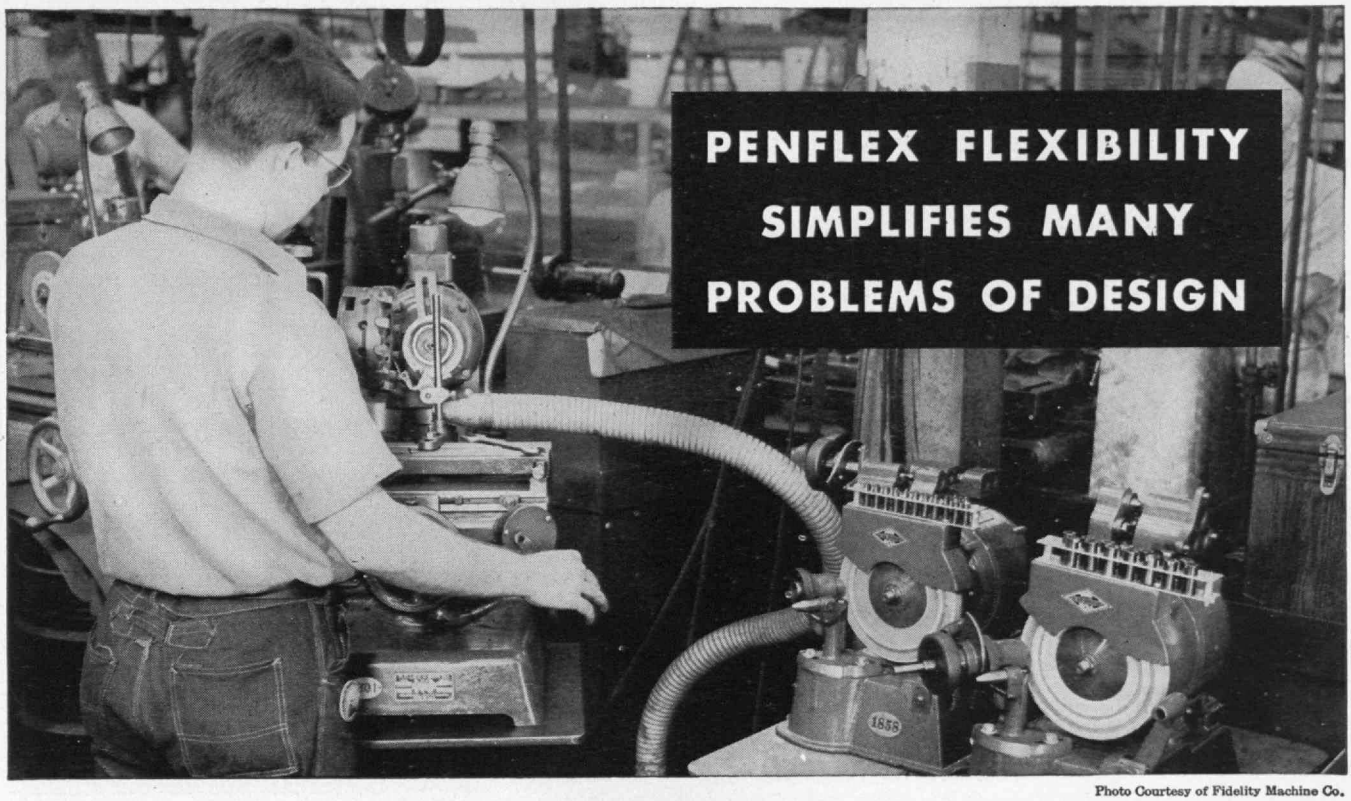
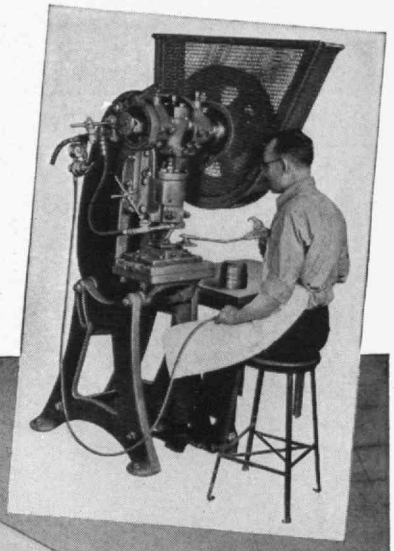


Photo Courtesy of Fidelity Machine Co.

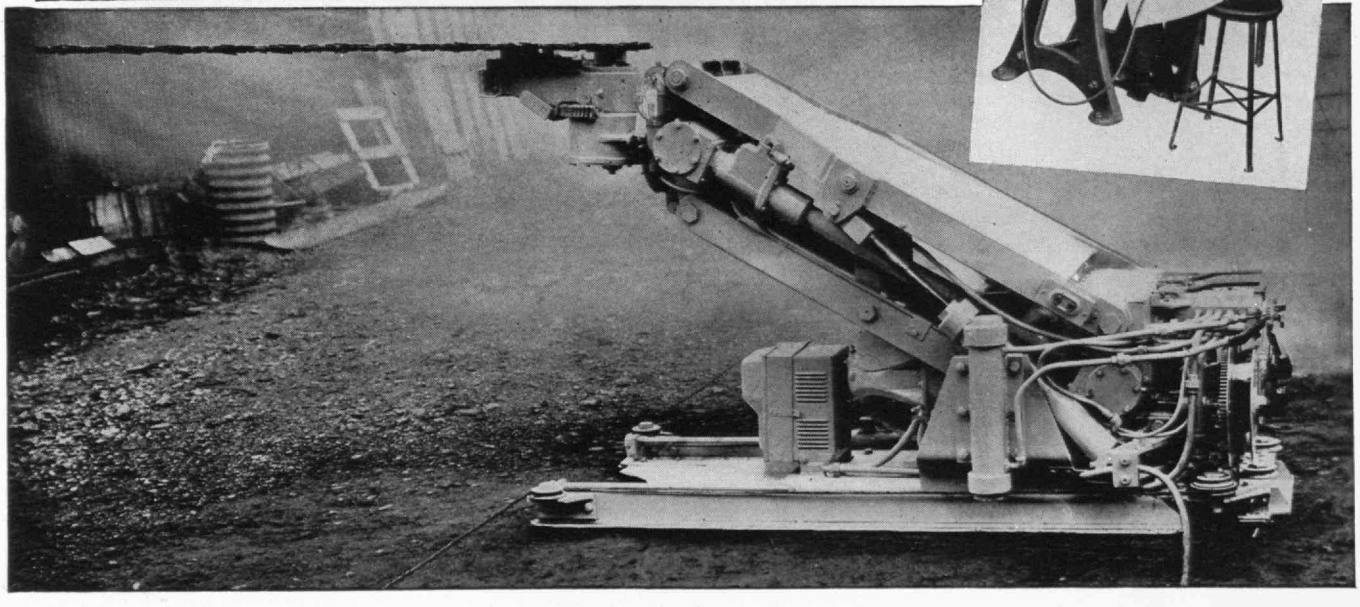
ILLUSTRATED are several applications of PENFLEX Flexible All-Metal Hose and Tubing, showing how PENFLEX simplifies design problems. Light in weight with flexibility to make inaccessible installations easy, PENFLEX All-Metal Hose and Tubing are suitable for mobile units, bilge ventilation, fume exhaust, dust collection, coolant conveying, hydraulic and air controls, vibration isolation, oil can and similar flexible spouting, armor for flexible shafting, conveying of dry granular materials, and many other applications in high or low pressures.

PENFLEX, tight as pipe but flexible, follows any desired path. Material flows through smooth, easy bends without sharp turns to clog.

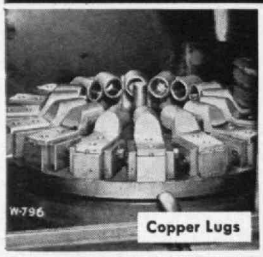
Tell us what type of material you are handling, and the operating pressures. We will send you data sheets promptly.

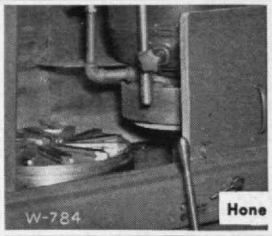


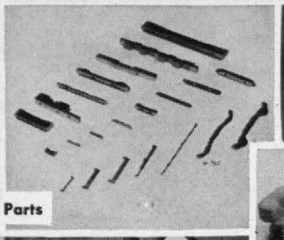
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7211 Powers Lane, Philadelphia, Pa.
ESTABLISHED 1902

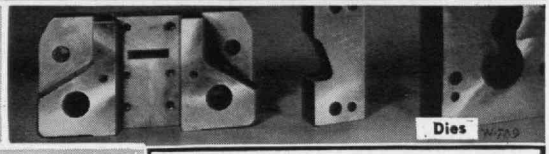


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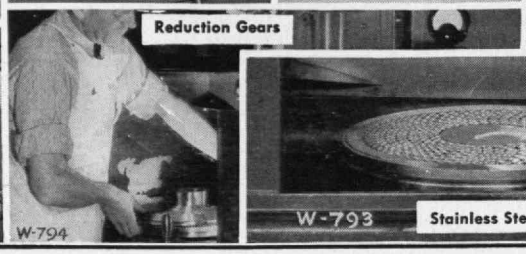




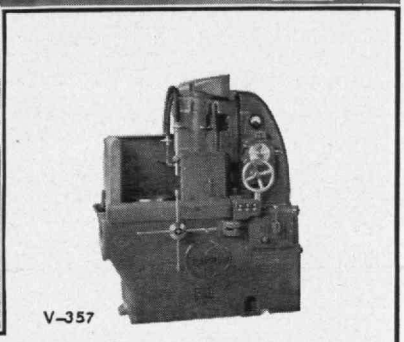




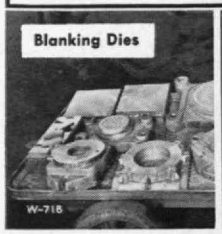


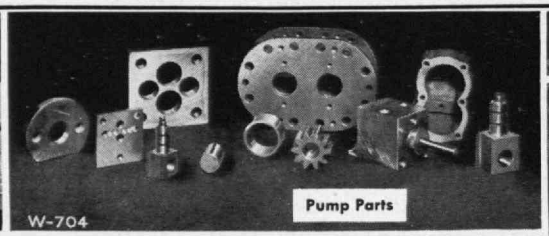


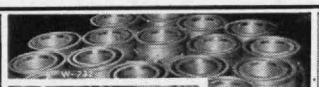


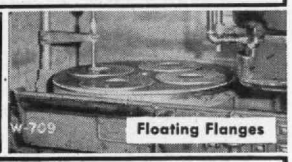


EXAMPLES OF WORK DONE ON THE NO. 11 BLANCHARD SURFACE GRINDER







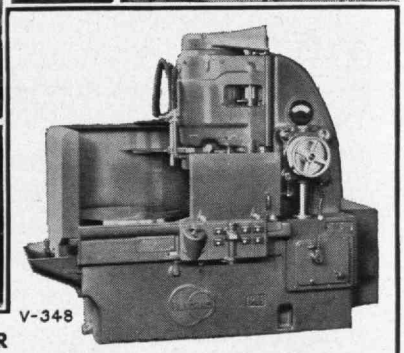




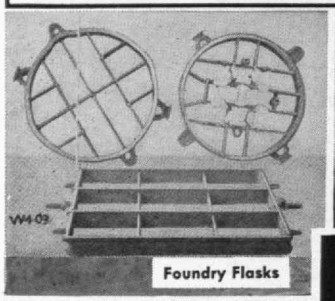


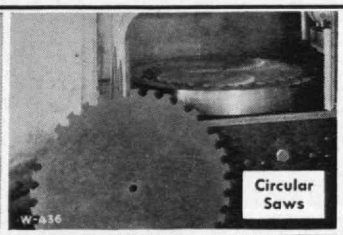


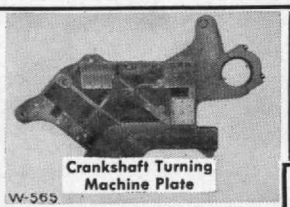




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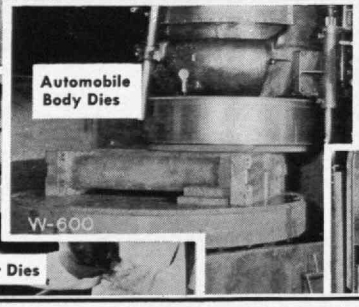


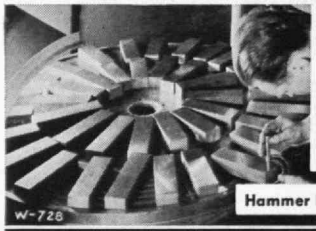




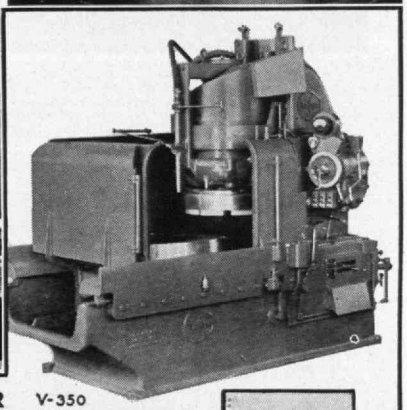












EXAMPLES OF WORK DONE ON THE NO. 27 BLANCHARD SURFACE GRINDER

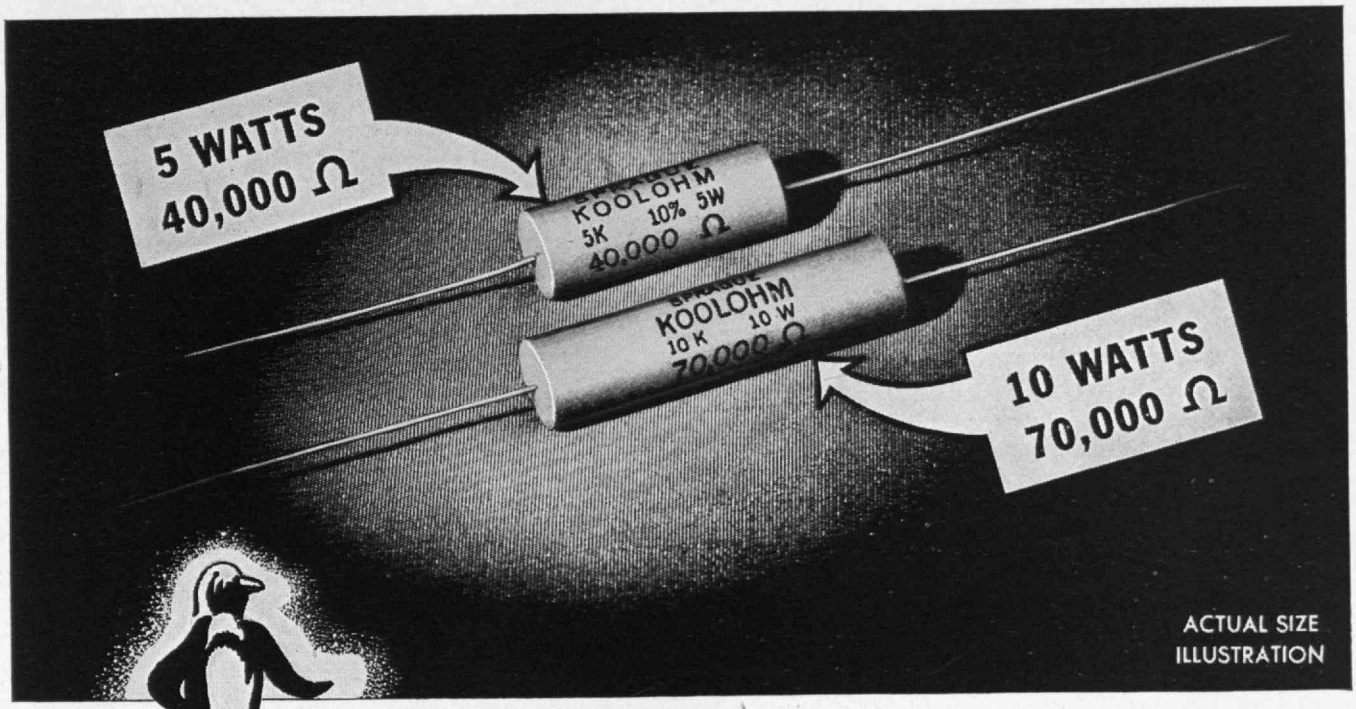
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THESE RESISTOR WATTAGE RATINGS MEAN WHAT THEY SAY



...Regardless of the ohmic values

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In brief, there's no need to "play safe" with Koolohms. You don't have to use a larger resistor than you actually require. You can forget your worries as to whether the wire size is big enough to carry the current and the resistor body large enough to withstand the temperature rise involved. *You can use any Koolohm at its full wattage rating—any time, anywhere!*

This freedom of use is made possible because Koolohm design is based upon a time-tested, inorganic insulating material. This is sintered on the wire *before it is wound*—at 1000° C.! The insulation is flexible, and has a dielectric strength of 350 volts per mil at 400° C.!

Samples free to industrial users. Catalog on request to all who are interested in better, more dependable resistors.

SPRAGUE SPECIALTIES CO., Resistor Division, North Adams, Mass.



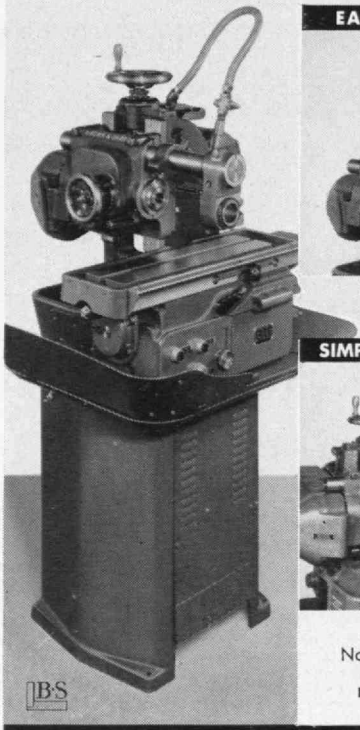
KOOLOHM WIRE IS 2¼ TIMES LARGER

Although Koolohm Resistors themselves are no larger—often smaller—than ordinary resistors, their wire is 2¼ times larger in actual cross-sectional area! This is especially important in the high resistance values where very fine wires so often fail to carry the currents involved in power resistor operation, or to withstand the corrosive effects of operation in high humidities. *Play safe* with Koolohms!

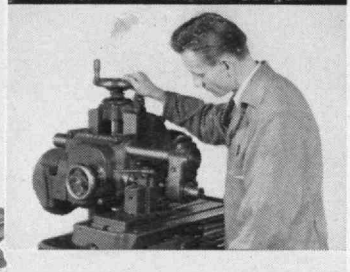
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POWER WIRE WOUND RESISTORS AND METER MULTIPLIERS

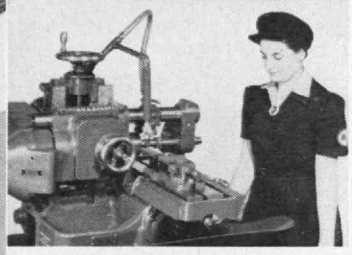
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THE TABULAR VIEW

Up in the Air. — Ancient history is expected to be marked by vagueness and controversiality; both qualities, however, apply strongly to much modern history, especially to that of modern technologies, where development has been so swift as often to elude the scholar. No one has done more to free the history of aviation from these difficulties than has S. PAUL JOHNSTON, '21. In this issue (page 419), he dispels the vagueness surrounding the story of William Samuel Henson, pioneer in aeronautical imagining, and in our Mail Returns column (page 410) joins with Fred C. Kelly, biographer of the Wright brothers, in analyzing a controversial issue dating back to the Wrights' early experiments.

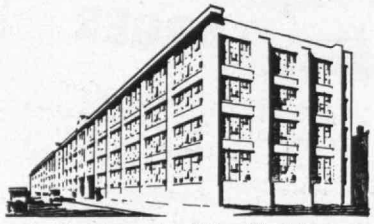
Opportunity. — Discussing another aspect of the problem of postwar economic readjustment which he considered in our issue for April, RALPH E. FREEMAN, Head of the Department of Economics and Social Science at Technology, points out (page 423) the necessity for freedom of action if the forces of technological change are not to impose dangerous strains on the economic structure.

"Gat's" Ancestry. — How the attitude of government toward invention in time of war has changed is clearly stated by GEORGE FORT MILTON (page 425) in his story of Richard Gatling and the famous Gatling gun of Civil War times. Erstwhile editor of the *Chattanooga News*, Mr. Milton is consultant to the National Resources Planning Board and to the Treasury Department. He has written widely on American history of the mid-Nineteenth Century, and as a raconteur of note draws on a limitless store of anecdote and history out of that energetic time.

Social Man. — Imponderable factors in the human equation which are of extreme importance in the personnel relations of industry are evaluated (page 427) by PAUL COHEN, '35, Editorial Associate of The Review and comprehensive analyst of scientific and technological questions.

New Values. — Some of the many ways in which concrete is being utilized to meet new wartime demands are sketched for The Review (page 417) by HARLAND MANCHESTER, special staff writer for the *Reader's Digest* and able reporter on myriad matters.

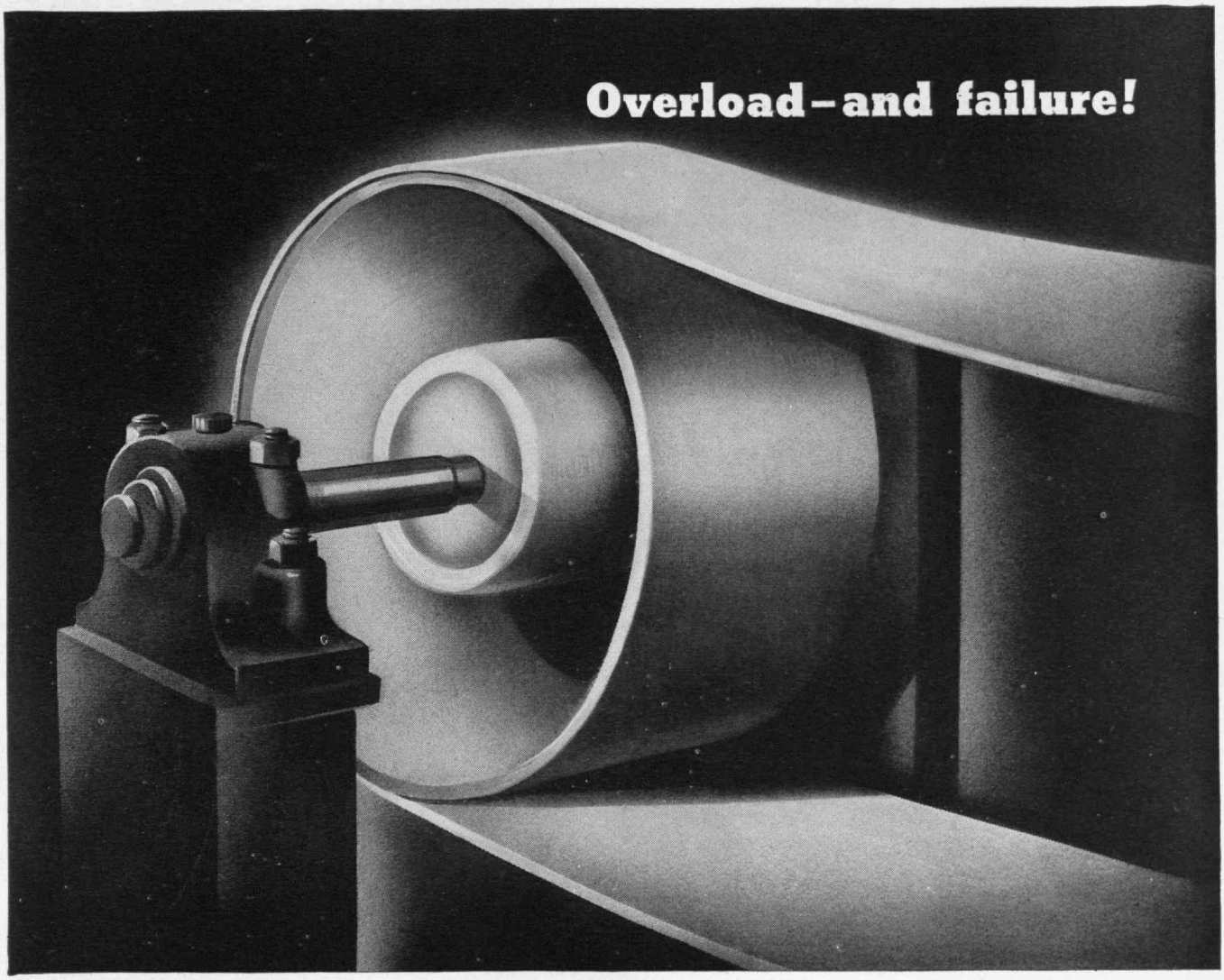
Speed with Economy



Mack International Motor Truck Corp.

Though our basic personnel still remains essentially the same, recent additions to our staff, due to war work, have contributed greatly to our versatility, to the volume of work we are equipped to handle effectively, and to the territory in which we operate.

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101 PARK AVENUE, NEW YORK
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Alfred T. Glassett, '20, Vice President



Information supplied by an Industrial Publication

Recent tests by a well-known rubber company prove that as little as three pounds extra tension on power transmission belting, above recommended tension, will shorten its life as much as 68 percent!

In the tests three grades of the present wartime construction of transmission belting were used. Each belt was run at 15 pounds per inch per ply, a 720 pound total for the tension, the recommended figure, and at 18 pounds per inch per ply, a total of 864 pounds tension, on 4 inch diameter pulleys. Belts were all 6 inches wide, 30 feet long, spliced in 10 foot endless lengths. Tests were all highly accelerated.

Belt No. 1 ran for 95 hours before breakdown under the 19 pound tension, and increased its life to 230 hours before failure when the tension was 15 pounds.

Belt No. 2 ran for 88 hours at the 18 pound tension, and for 263 hours before failure at 15 pounds.

Belt No. 3 ran for 15 hours under 18 pound tension, and the service life before failure jumped to 48 hours under the 15 pound tension.

Close attention to "details" like this will save costly shut-downs and increase productive man-hours. This is just another case of designing to meet requirements — another important conservation measure.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
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MAIL RETURNS

The Mysterious Visitor

FROM FRED C. KELLY:

I have recently had my attention called to an article in your issue of March, 1942, in which S. Paul Johnston ['21] quoted from an article of mine in *Harper's Magazine* (August, 1940). Mr. Johnston declared that a statement I made there is untrue. Even though the question in controversy does not seem to me important, I feel as if I should not ignore, even after many months have elapsed, a suggestion that I am an inaccurate reporter, particularly inasmuch as what I wrote is fully supported by incontrovertible facts.

I told in *Harper's* of a mysterious visitor who came in the autumn of 1905 to the field near Dayton where the Wright brothers were making flying experiments; of how this visitor, who did not reveal his identity, turned out to be Charles M. Manly, chief mechanic for Professor Langley of the Smithsonian Institution. Contradicting my story, Mr. Johnston wrote in your magazine, "Whoever the visitor, plenty of evidence is available that it was not Charles Manly." If plenty of evidence is available that the man was not Manly, much more can be presented to show that the man *was* Manly. I shall offer here only part of what is at hand but enough, I believe, to make clear that there can be no question about the identity of the mysterious visitor.

First of all, though, let it be made clear that there was never any indication that Manly had any malign intentions in going to see what the Wrights were doing. There was not a shred of evidence then, and no more today, that Manly had any notion of stealing ideas or knowledge from the Wrights. On the contrary, he made a public statement not long afterward in which he gave them full credit and praise for what they had accomplished. If there can be any criticism against Manly for being a bit mysterious and not revealing his identity, it cannot be against his moral character but only against his sense of discretion. Presumably he had heard exaggerated stories about how secretive the Wrights were and came to the wrong conclusion that he would have been less welcome if they had known who he was. The truth is that the Wrights would have shown every possible courtesy and explained to him more about their machine than he could well have seen at a glance. They knew Professor Langley, with whom they were on friendly terms, to be an honorable man, and would have accepted anyone associated with Langley, in the way Manly had been, as equally honorable. Manly undoubtedly was motivated solely by a desire to satisfy his curiosity — a curiosity naturally more impelling than if he had felt only a casual interest in flying. Since he had worked with Langley during several years of unsuccessful attempts to build a machine capable of flight, his curiosity about the achievements of the Wrights must have been intense.

During the short time of his visit, Manly showed an intimate knowledge of flying machines and great familiarity with aeronautical terms. Charles Taylor, the Wrights' mechanic, who accompanied him into the hangar and workshop, remarked a few minutes later: "That fellow's no writer. At least, he's no ordinary writer. He knows the right name for everything he sees."

In November, a few weeks after the Manly visit, the Wrights received a telephone call from the Secretary of the Dayton Commercial Club (later the Chamber of Commerce), who said he had a telegram from Homer W. Hedge, President of the newly formed Aero Club of America, asking for information about the Wrights' recent flights. In his telegram Hedge said that Charles Manly reported in a speech before the Aero Club (November 14) that the Wrights were able to control their machine in all kinds of weather and that within the last two months they had made more than 50 rounds of their field near Dayton. Later the Wrights received a copy of the New York *Herald* of November 15, containing an article based on Manly's lecture. If Manly had not been a visitor at the Wrights' field, just how did he obtain all the information first revealed in his lecture? No one else had made any statement about what the Wrights had been doing.

A peculiar circumstance was that in a later article dealing more fully with the same subject, the New York *Herald* did not use Manly's name, as it had in the earlier article. In the paragraph telling of the Wrights' recent flights, it attributed the news to "a man in the city who was in the secret of their successes." Why should "a man in the city" not wish to have his name connected (*Continued on page 410*)

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MAIL RETURNS

(*Continued from page 408*)

with the honor of being the first to furnish an account of the Wrights' "successes," unless embarrassed over the manner in which he had obtained the information?

To the Wrights the visitor at the field had seemed nervous, ill at ease, anxious to get away, though he had been seen in the distance for two or three days before. After the man went away, and Orville and Wilbur Wright were wondering who he could have been, Orville remarked: "If I ever see him again, I'm sure I'll know him." Some time later when the two did meet, in New York, Orville was indeed sure. Everything in Manly's appearance and manner of talk corresponded exactly to the man who had visited the field.

Mr. Johnston seems to base his contention (that Manly was never at the Wrights' field) largely on the state of Manly's mustache. He says that the Wrights "recollected clearly that their visitor had no mustache at all, or that it was 'very close cut'"; but that "before, during, and after autumn of 1905 Charles Manly wore a magnificent 'handle-bar' mustache." He adds that "ample photographic evidence is extant on that score." On these points Mr. Johnston, it appears, is simply mistaken. There is no evidence in existence that the Wrights "recollected clearly" what kind of mustache Manly had when he was at the field. In a letter written long afterward regarding Manly's visit, Orville Wright expressed his clear recollection of Manly's appearance when he met him for the first time *as Manly* — that is, when they were introduced to each other in New York. Orville remembered that at the time of their New York meeting Manly's mustache was close cut, not at all a handle-bar type. Notwithstanding what Mr. Johnston says, many pictures of Manly have been published, some taken just before 1905, others afterward, up to almost the time of his death, showing him without any mustache or with only a small one. True, a picture of him was published in the New York *Herald* (late November, 1905) in which he had a handle-bar mustache, but he looked so youthful that the picture had evidently been taken some time previously.

All available evidence points to the mysterious visitor to the Wrights' field as having been Manly. But what of it? I repeat that nothing about his going there or about any use he afterward made of the information obtained reflects on Manly's character.

Peninsula, Ohio

Still Mysterious

From S. Paul Johnston, '21:

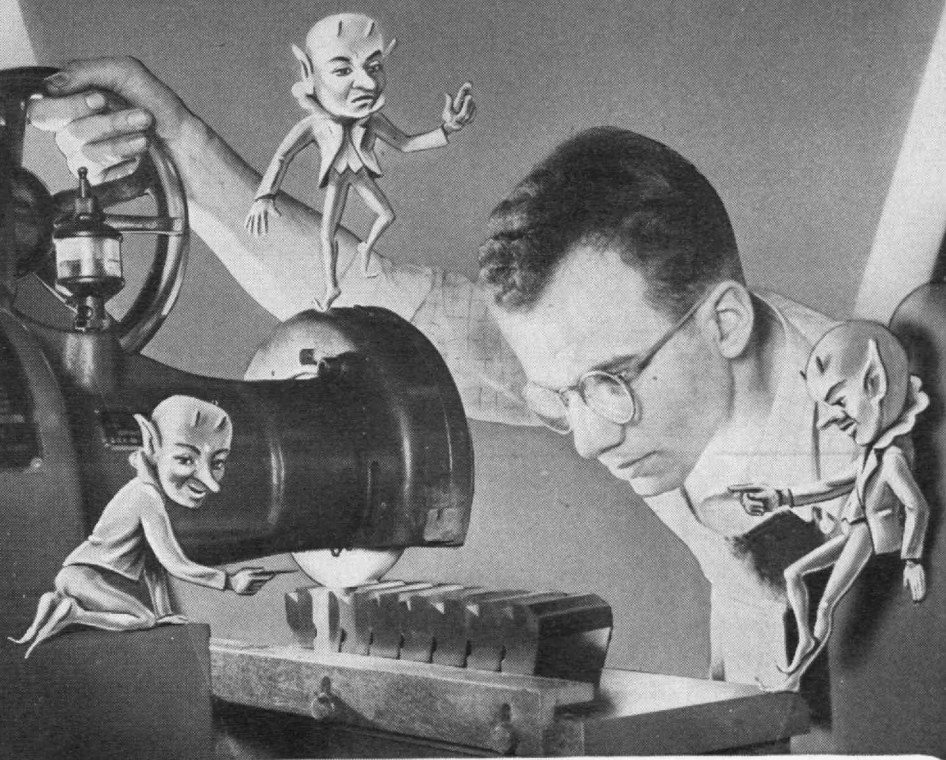
I have read with interest Fred Kelly's comments on my article, "Aide in Aerodromics," which appeared in The Review for March, 1942. Although I see no great point in debating *in extenso* a very minor point of history, I am still of the opinion that the mysterious visitor at the Wrights' hangar at Dayton in September, 1905, was not Charles Manly. The original statement was based on a considerable amount of research, and I have discovered nothing since to cause me to alter it.

During the fall of 1940, after the appearance of Mr. Kelly's article in *Harper's* for August, Basil Manly went to some lengths to establish the fact that his brother Charles had not visited Dayton in September, 1905. Orville Wright wrote him a long letter on September 30, 1940, describing the visit in detail. In touching on the matter of the mustache, Wright said: "Our recollection was that the man at the field had none. If he had one, it was small."

Basil Manly was closely associated with his brother then and later, especially during 1907, when they worked together on the Langley *Memoir*. He is certain that Charles wore the luxurious "handle-bar" mustache during 1905 and for many years thereafter. The "handle-bar" shows up clearly in several photographs made both before and after the date of the alleged Dayton visit, which are preserved in the family records. It was the kind that does not sprout overnight.

Those who knew Charles Manly well during his lifetime have been questioned about the Dayton visit. The list includes Basil Manly, Albert Zahm, and C. B. Veal, Manly's later partner. None of them has any reference to such an incident. Yet all these people were his intimates, and with them all he discussed constantly matters pertaining to aeronautical development. (*Concluded on page 458*)

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"Quit kiddin'," he says. "There are exceptions to grinding rules. I'd use a wheel as soft as G or H and take extremely light cuts for surface grinding, IF we were grinding a solid piece of hardened steel with a larger area of contact.

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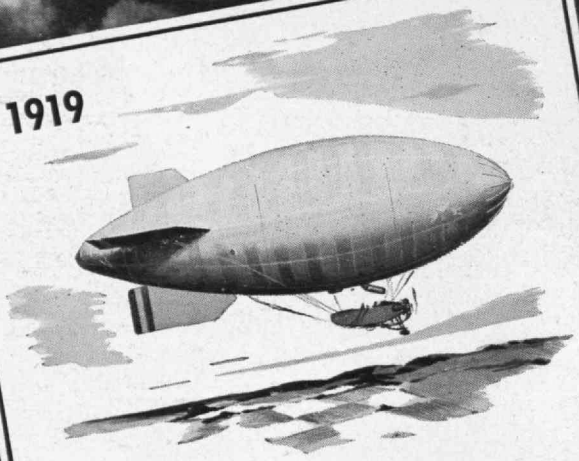
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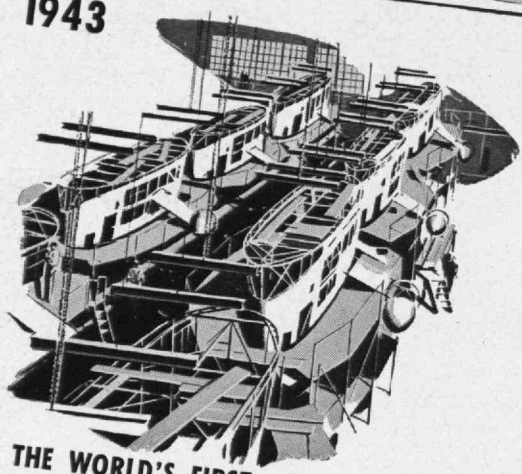
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1919



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1943



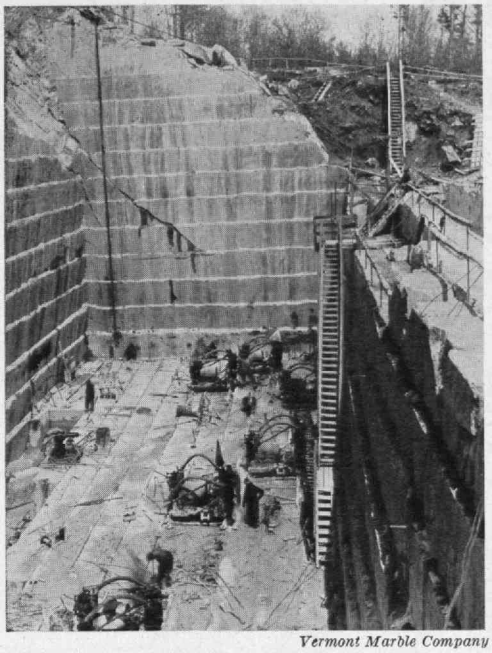
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VOLUME 45 NUMBER 8

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AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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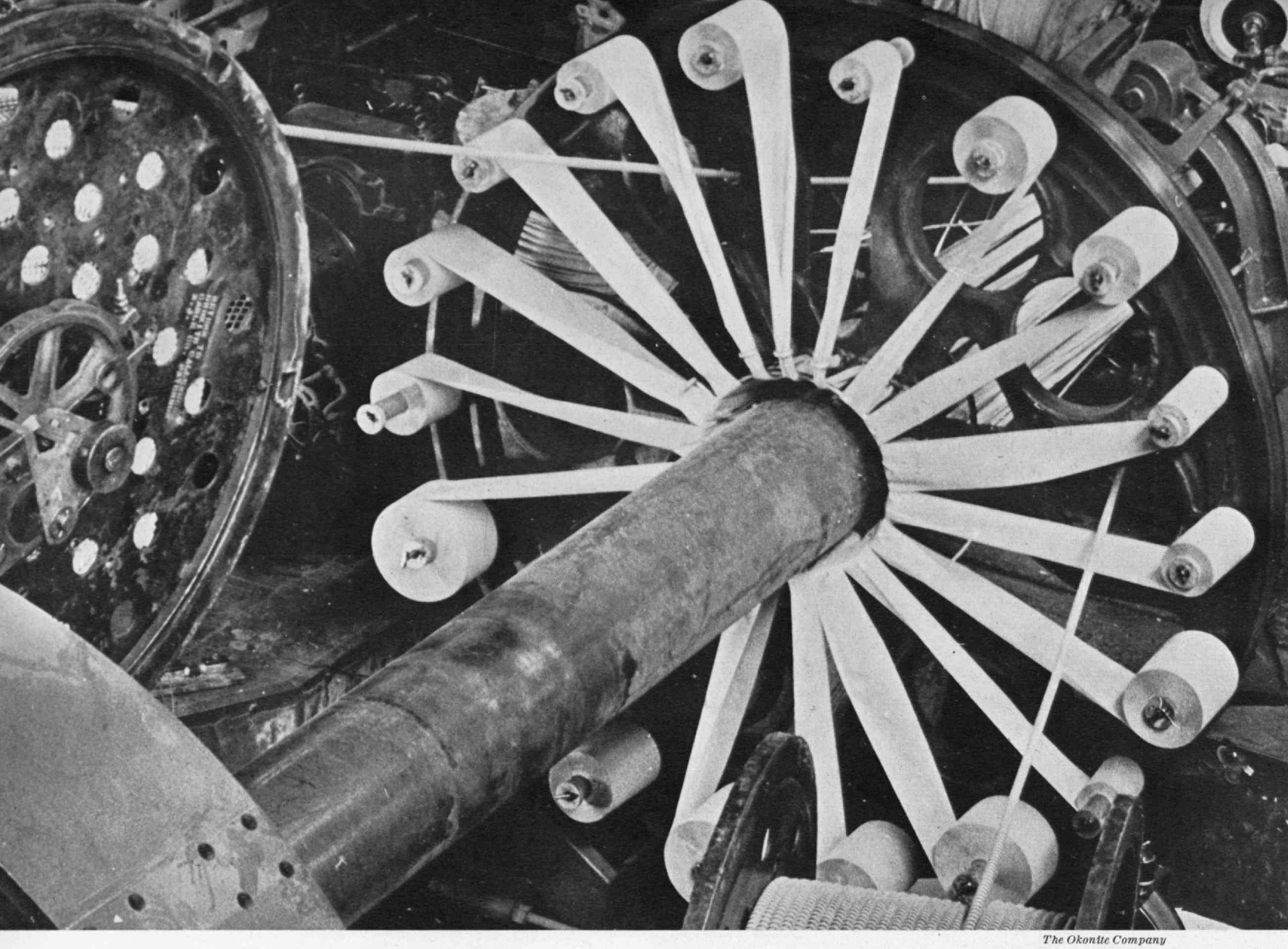
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June, 1943

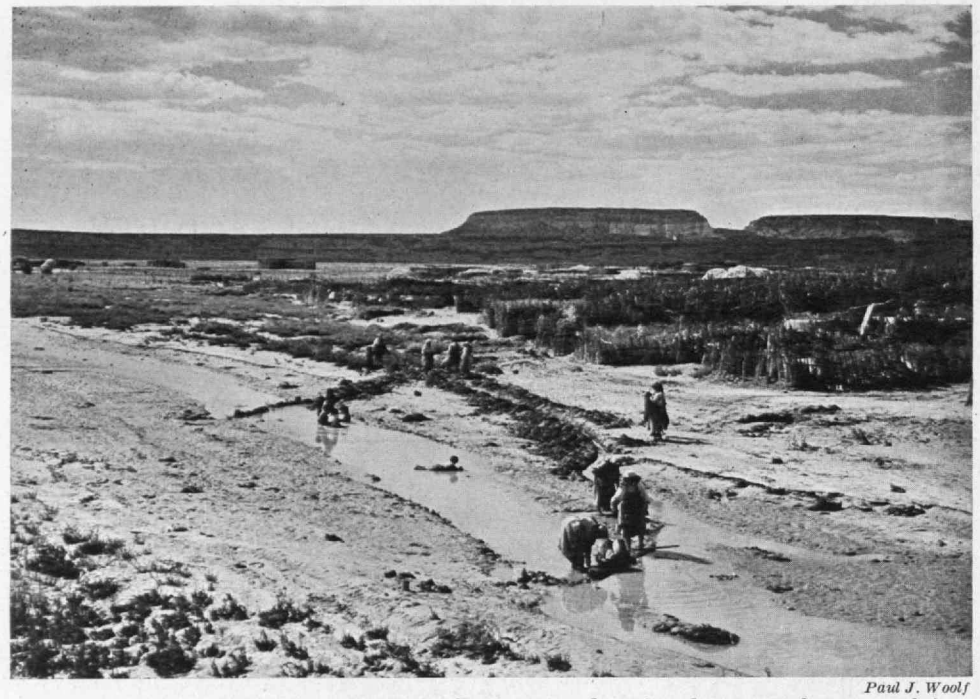
The Trend of Affairs

Drilling with Decorum

THE drilling of oil wells is regarded by the uninitiated, with some justice, as a pursuit for roughnecks. Oil derricks are not aesthetically satisfying. They tend to surround themselves with dirt, odors, and soul-shaking noises. It is, therefore, not an unmixed blessing for a city to discover that it is built over an oil field, and derricks on the front lawn — town-lot drilling, as it is called — have on occasion become such an evil that regulation by law has become necessary. Since the 1890's, oil fields in and around Los Angeles have been known and exploited, mostly with shallow wells which in many cases have ceased to be profitable producers and have been abandoned. Oil-bearing strata are suspected to exist below some of the played-out sands, and the city of Los Angeles has zoned a 1,500-acre tract for drilling, in part because of government insistence that for military reasons California increase its crude oil reserves. The operation, however, has been surrounded with many restrictions relating to noise, dust, and odors, and the city council has also made the provision that all the drilling to tap the strata beneath the zoned tract shall be done from a single location only 18.8 acres in area.

The initial test well is being drilled with a unique derrick, whose standard steel skeleton is completely covered with soundproof and fireproof insulation. A large door can be raised to permit the introduction of piping and apparatus. Otherwise, work goes on in an artificially lighted and ventilated interior, the usual scrapes and bangs associated with drilling being muffled into inaudibility within a short distance of the well. The company undertaking the job has even indulged in a little landscaping. More drilling in Los Angeles under more or less the same conditions is reported to be now in prospect. This noiseless oil well, with the promise it offers of enabling oil-well drilling to proceed in urban areas without destroying property values or becoming a nuisance to the citizens, has excited considerable comment in the industry. The aspect of the project which seems most unusual to the layman — that of drilling from one small location possibly scores of wells whose bottoms drain thousands of acres — has, on the contrary, been taken matter-of-factly. During the past decade, the petroleum industry has developed a wide variety of surveying instruments and deflecting tools for wells. By means of these, controlled directional drilling has become a routine practice. With the aid of compasses, gyroscopes, pendulums, automatic photographic recording equipment, and many other devices, all incased in long, slender housings which can slide easily through thousands of feet of tubing, the inclination and direction of the well can be accurately determined, enabling operators to start thousands of feet away and drill close enough to a burning oil well to snuff it out from many feet below the surface, or do the more prosaic but also difficult job of drilling a really straight hole, saving time, mechanical troubles, or the lawsuits which can follow if a well should drift off into someone else's property. One analysis has shown that every time a well is allowed to deviate more than 3.5 degrees from the vertical, an average of six days' drilling time is lost.

Directional drilling has been widely used to side-step the effects of surface obstacles, whether they be natural like lakes, or man-made like wharves, buildings, and other surface improvements. Off Elwood, Calif., wells have been drilled from piers extending 2,000 feet from shore, the wells being only 8 feet 6 inches apart at the top but hundreds of feet apart at the bottom. Had each well required a pier, the field would have been exorbitantly expensive to exploit. In many cases, underwater oil deposits have been drained entirely from adjacent dry land.



Paul J. Woolf

Irrigation engineering in primitive terms: Zuñi women damming the stream that serves their pueblo, in order to divert water to the corn patches that fringe its banks

One for the Book

THAT *The Book; the Story of Printing and Bookmaking* * by Douglas C. McMurtrie, '10, is the seventh revision of a volume which originally appeared in 1927 under the title *The Golden Book* indicates several things: The history of the art which has contributed so greatly of good and ill to the development of our civilization is a very long and involved one; Mr. McMurtrie is an assiduous scholar who is not content to stop short of completeness, and his subject is rich in new discoveries; he is also one of those fortunate beings who enjoy writing about a well-known and well-loved subject and hence can impart that enjoyment to their readers.

For *The Book* is in unusual degree a volume to be enjoyed. Though it is a "discussion of books and their makers . . . written from the viewpoint of the designer and printer," it speaks to anyone who has an appreciation of books as such, or of the values of design, or of the profound satisfactions in history of something other than wars and politics.

On this last count in particular, *The Book* is a storehouse of vitally interesting material that has bearing on a score of techniques in addition to that of printing, which is of course its main focus; a good unit of evidence in support of this is the admirable chapter explaining what conditions existed in Europe in the early Fifteenth Century, to be precipitated into the invention of printing from movable types — a chapter anticipated by Mr. McMurtrie in The Review for November, 1940. Concluding the survey in this volume with the admission that the invention resulted from a synthesis or combination of known elements, Mr. McMurtrie well observes, however, that "the creative power of synthesis is one of the highest and most exceptional of mental faculties."

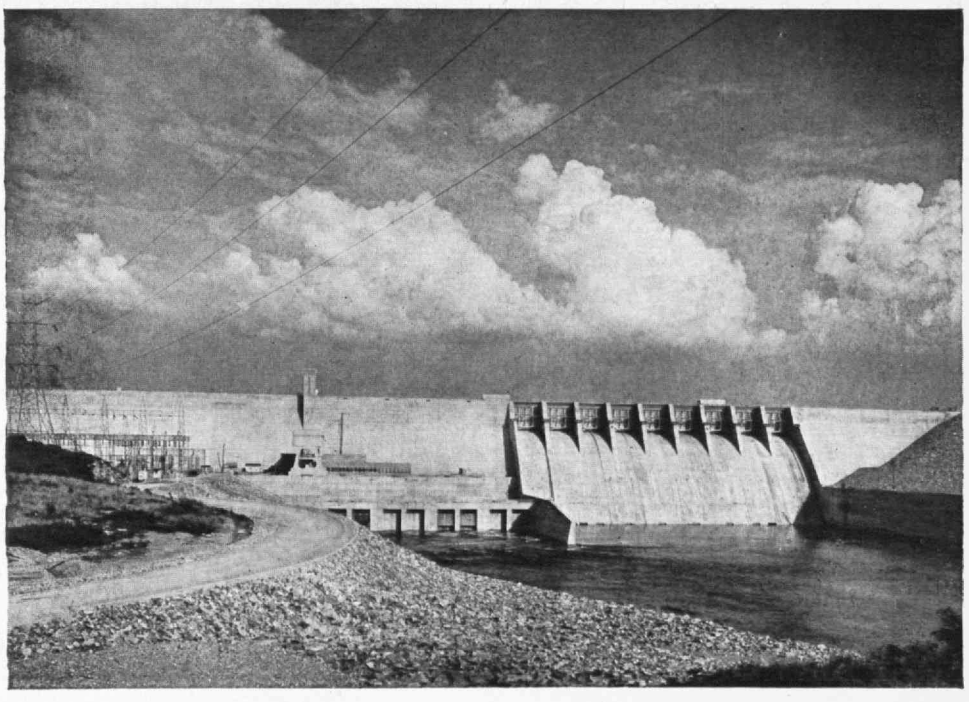
To recount what has been done with and by the result of that synthesis in the centuries since the 1440's is the principal undertaking of *The Book*. Throughout, that story is told with a friendly ease that makes readily assimilable an otherwise almost forbidding array of fact and scholarship. As a consequence, the reader will the more appreciate Mr. McMurtrie's concluding discussion of present-day conventions and practices in typography, and his pungent setting forth, in the final chapter, of ideals for the printer of the future.

* New York: Oxford University Press, 1943. xxx+710 pages. $5.00.

Remuda

UNDER the rulings of the Food and Drug Administration on the manufacture of oxygen, the gas as now compressed and sold is suitable for human consumption, whether in manufacture it was intended for industrial or hospital use. As a result, all the oxygen on a battleship, for example, whether it is there to be used in welding or in hospital applications, can be employed for the emergency treatment of wounded sailors. ¶ A method of chromeplating steel, devised by an engineer of a publishing firm in order to give longer effective life to "doctors" — blades which scrape excess ink from the copper cylinders used in gravure printing — is aiding in the war effort through partly relieving the tool-steel shortage. The knife-edge of a cutting tool which has been subjected to the process can be frequently resharpened with no loss in effectiveness. The life of the tool is reported to be increased many times as a result. A treated drill made 8,000 holes in phenolic sheet without requiring regrinding; 4,000 holes were the limit for an ordinary drill. ¶ The traffic engineer is finding additional important work as a result of the war: The six o'clock shift of the largest war industry plant in Rhode Island now moves away from the factory in 14 minutes instead of 35, thanks to improved routing. In Tacoma, Wash., other traffic experts found ways to save comparable working time through eliminating a single-road bottleneck serving some 40 per cent of the 10,000 workers of a war plant. ¶ Victory gardeners who can can can can if they want to; those who can't can or don't want to can can dehydrate. Such a canny conclusion seems justified by various reports of the development of home dehydration processes, some involving simply the use of wooden trays, covered with cotton netting, in the family oven; others calling for the use of plywood cabinets, with lamps for even heat, a small electric fan for circulation, and removable trays for drying the produce; and still others, as yet at the drafting-board stage, presaging mass-produced dehydrators to be plugged into the domestic lighting circuit. ¶ Among the many reforms

which peace is expected to bring in its train, reform of the calendar is much mooted. Argument is that for any alteration of habit and custom so far reaching as calendar reform would involve, some international document of such scope and substantiality as a peace treaty is the needed vehicle. Plans for new calendars are and have been numerous. One which has been widely noted is the work of Willard E. Edwards, '26, who has been actively interested in the problem for a good many years. Late in April, the house of the 22d session of the legislature of the Territory of Hawaii adopted without opposition a resolution urging Congress to propose the Edwards calendar for adoption by all nations at the future peace conference and to propose to all the United Nations that they name national committees to study the Edwards calendar with a view toward adoption of it at the peace conference. The calendar which Mr. Edwards has drawn up sets New Year's Day as a day apart, leaving 364 days for the remainder of the year. These are evenly divisible by 2, 4, and 7 into equal half years, quarters, and whole weeks. Monday is established as the first day of the week. January begins on Monday and has 30 days; February, on Wednesday, and has 30 days; March, on Friday, and has 31 days. This pattern of "30, 30, 31 — Monday, Wednesday, Friday" is repeated in each quarter. The 366th day which marks leap year is inserted each fourth year between Sunday, June 31, and Monday, July 1, and is regarded as a day apart. ¶ Equal and in some ways superior to printing plates made of war-scarce copper, plastic plates are carrying a steadily increasing share of the printing load. Principal user of plastic plates is the Federal Government; for example, some 20,000 plastic cuts go overseas from the Office of War Information each month. Shipping costs are cut to the bone, since the plastic plates weigh only about an eighth as much as the metal plates which they replace. Another prime advantage from the pressroom point of view is that, if damaged, the plastic plates can be repaired as metal plates cannot. Plastic plates that can be etched as metal is, and therefore can be used in the direct production of original photoengravings, are available to a limited extent. Further development in this field would promise answer to many a printer's prayers. ¶ Of the mineral-fuel reserve of the United States, more than one-sixth is represented by 939 billion tons of lignite, or "brown coal," the American Society of Mechanical Engineers was told recently. Though it contains more water and ash than does ordinary coal, following of proper procedures in handling and burning lignite should make possible more extensive use of it. The principal lignite deposits of the nation are in Texas, Montana, and the Dakotas. ¶ Mirrors and light rays replace targets and ammunition in the precision sighting of semiautomatic rifles by means of recently developed new equipment. The sight setting from a "master" rifle which has been correctly sighted by firing is transferred to rifles subsequently sighted in the new device, which is called an "optical rifle sighting gage." In the sighting of each gun, 13 rounds of ammunition, as well as considerable time, are saved by the new process, which establishes in rifles subjected to it the relationship between line of sight and line of bore determined by the master rifle.



Cherokee Dam and powerhouse constructed by the Tennessee Valley Authority, with Theodore B. Parker, '11, newly appointed Head of the Institute's Department of Civil and Sanitary Engineering, as chief engineer

Concrete to the Rescue

BY HARLAND MANCHESTER

IN this day of shortages, we have at least one abundant raw material left. There is no limitation to the supply of Portland cement. It is made of plentiful ingredients like lime, silica, alumina, and gypsum, and processed in plants all over the United States. It is cheap, it is versatile, and builders and manufacturers are now using it in countless new ways. To mention concrete manhole covers, bathtubs, oil storage tanks, traffic signs, sash weights, and precast stairways is only to suggest the variety of applications which save critical materials. Of lasting significance are new techniques which have brought concrete construction farther in the last two years than it had traveled in the previous decade.

Because of a new method of concrete construction, the latest "biggest factory in the world" is now nearing completion months ahead of time, and the newest plane engines will soon be rolling off its assembly line. When the firm of Albert Kahn got the order for the plant last year, they drew up plans for a building of structural steel, but they found steel hard to get. They next

considered building the vast, one-story structure with an arch-rib roof of reinforced concrete supported by concrete pillars. But conventional concrete construction is slow business on a rush war job. The bottleneck is the building of temporary wooden forms which must remain in place until the cement sets and then must be torn down and reassembled as construction proceeds — a method costly not only in time but in timber and carpenter man-hours.

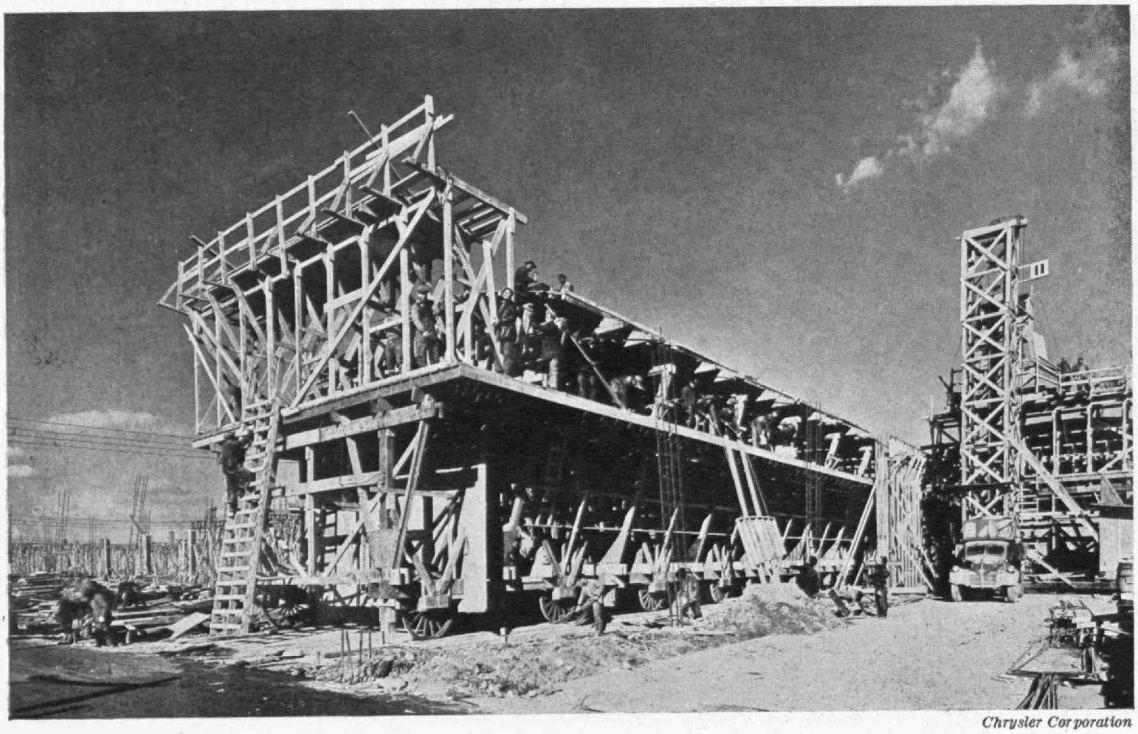
The problem was solved dramatically by erection of huge, tablelike, portable forms that were mounted on artillery wheels. After the concrete was poured on the first section of roof, and the special quick-hardening cement was firm, the tabletop was lowered a few feet by means of special elevators and pulled by truck to the next position. Onlookers stared as the battery of giant tables marched down the length of the tremendous building, leaving behind them the concrete shell of the new factory. Form work which once took four days was now done in one. The plant will be completed in six months' building time, according to the latest estimate, and with the same amount of material and labor it would have taken a year by the old method. Using similar portable forms, a New Jersey war-plant contractor placed five acres of concrete a week instead of the one acre which used to be par, and the same method is being used to rush a plane-engine plant in Kansas City.

Another development — vacuum concrete — which hardens in ten minutes so that workmen can walk on it, contributed to the swift construction of the War Department's great Pentagon Building in Arlington, Va. Vacuum concrete is the invention of Swedish-born Karl Billner of Philadelphia. Six years ago, Mr. Billner astonished skeptics by devising a portable mat with a plywood back and a rubber washer around its edge. A hose from the mat was connected with an exhaust pump. He lowered the mat over a freshly laid section of concrete sidewalk and started the pump. Ten minutes later he removed the mat, and a 200-pound man walked over the fresh pavement without leaving footprints. Billner proved that quick removal of the "free water" not only hastened production but often improved the quality of the concrete. Wartime need for speed has brought the invention into its own, and his batteries of suction mats have quick-cured over a thousand acres of concrete surface in war plants, barracks, bridges, and administration buildings. Since the vacuum-treated floors will support workmen a few minutes after the pouring, wall finishing and other inside jobs can proceed at once.

The mobile concrete plant has been streamlined for new war jobs. When emergency water pipe lines were needed for thousands of new war workers in Norfolk and Newport News, a New Jersey firm moved its plant to the site on 35 freight cars and used derricks to dump the wet mix into upright pipe molds. Germany has mobile plants to repair bombed buildings. Standardized sheet sections of concrete are poured on the spot, hardened quickly by artificial means, and hoisted into place by cranes.

Lightweight concrete, in which burnt clay particles, pumice, furnace clinkers, and other light fillers are used in place of gravel or crushed rock, is attracting wide attention. The 14,000-ton *Concrete Number I*, a tanker launched last fall in California, carries many thousand additional barrels of oil because the use of burnt clay reduces her weight. Foundation costs have been reduced in hundreds of buildings by the use of these light aggregates, while for use in house construction are lightweight slabs which will take nails, may be cut to fit, and provide excellent heat and sound insulation.

In England, houses are being built of slabs made of treated sawdust mixed with cement and other ingredients. The slabs are fire resistant, can be sawed or nailed like wood, and are so light that women can do much of the construction work — a big (*Continued on page 454*)



Chrysler Corporation

Juggernaut concrete forms, some of them more than 120 feet long, speed the construction of a war plant. After a cycle of seven days, during which the forms are rolled into place and set, and the concrete is poured and dried, they can be moved to new positions in eight minutes.

Grandfather of Flight

*William Samuel Henson, Long a Shadowy Figure in Aeronautical History, Emerges in Clearer Outline**

By S. Paul Johnston

ON Friday, the 23d of March, 1888, readers of the Newark, N. J., *Daily Advertiser* noted with satisfaction that "slightly warmer, fair weather" was in prospect. The politically inclined viewed with alarm or chuckled with glee over a report that a bolt of lightning had struck the Senate wing of the nation's Capitol ("balls of fire" had frightened the august occupants, had knocked down a bored cab horse tethered outside). The internationally minded bumbled approvingly over a cable that "Queen Victoria started yesterday for Cherbourg" (the weather being foggy, the Queen traveling as Countess of Balmoral). Sportsters in barroom and barbershop argued loudly a dispatch that the "Men of Washington" had neatly trounced the New York Giants to the tune of 6 to 5 (Crane pitched for New York, O'Day for Washington).

But an historic moment had passed without headlines. Little noted, it was mentioned only in the obituary column of the day:

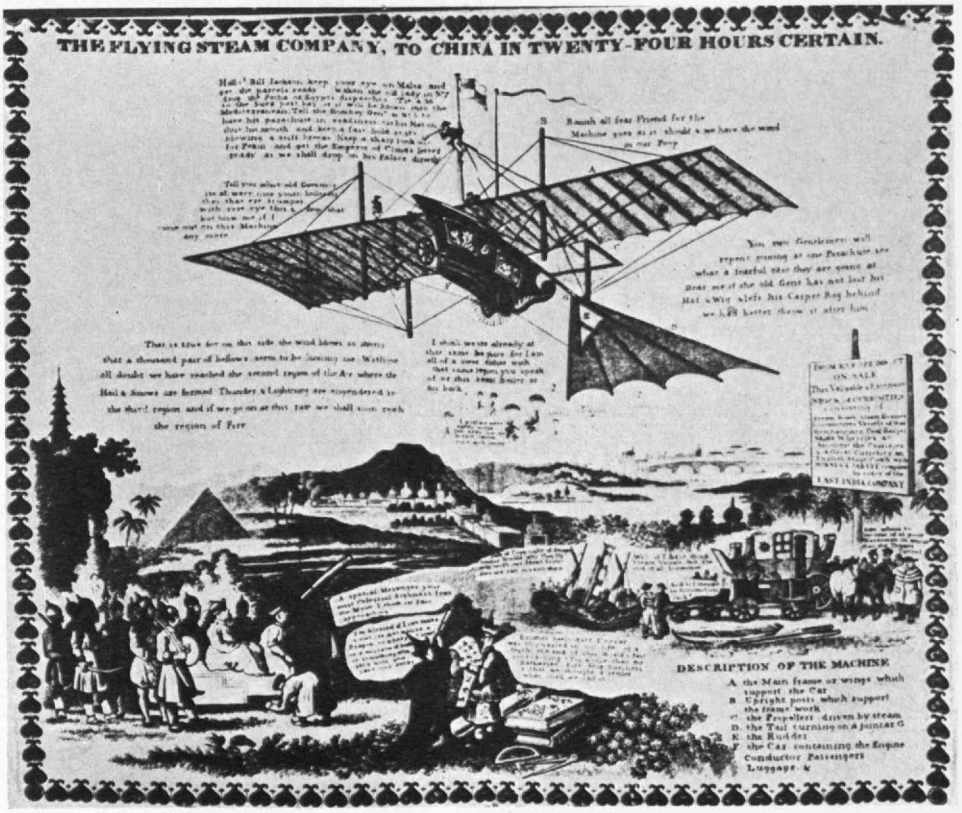
HENSON — On the 22nd inst. William Samuel Henson, in the 76th year of his age. Funeral tomorrow, notice of which will be found in tomorrow's paper.

Again a seemingly unimportant event went unremarked; no funeral notice made the paper the next day. By the 24th of March, the name was almost as completely buried as the man.

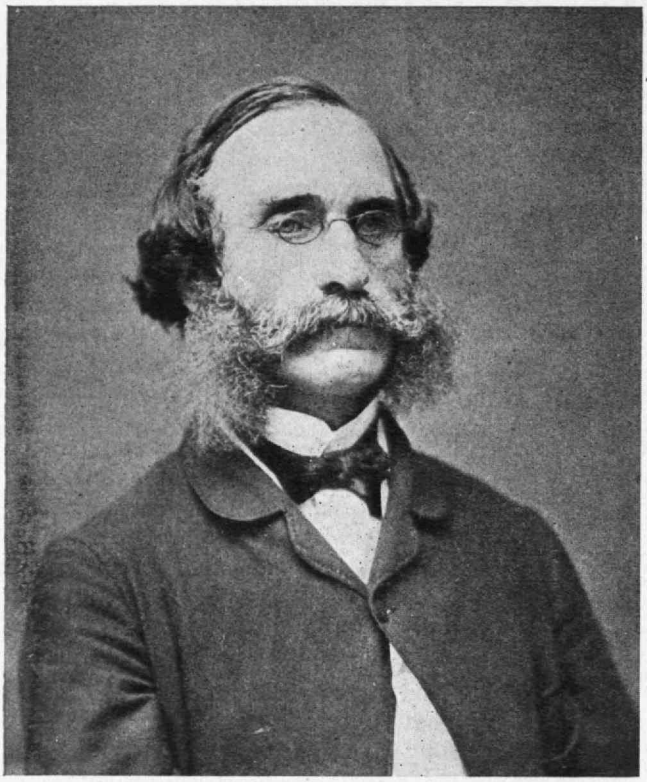
Thus passed in obscurity, many miles and many years removed from the scenes of his short-lived fame, a man who, following in the footsteps of Sir George Cayley, dreamed dreams of heavier-than-air flight and its commercial implications almost a hundred years before science and technology made such things possible.

It was once said of the aeronautically inclined that "a man doesn't have to be crazy to be in aviation — but it helps." Certainly Henson's patenting his "aerial steam carriage" in England in 1842 and the subsequent public promotion of a company to establish an air line from London to the "Plains of Hindustan" caused a deal of eyebrow lifting among the neo-Victorians. Of course, his ideas were quite impractical at the time. He had no knowledge of structural strength requirements. His notion of the power needed for flight was completely unrelated to fact. But full credit must go to Henson

* Recently, many data concerning Henson's life have been uncovered. Clippings, letters, and diaries long buried in cellar and attic have been made available through the courtesy of Henson's granddaughter, Winifred Lipsham, and her father, George W. Lipsham, of Orange, N. J. A grandson, E. T. Henson, also contributed to a new fund of Hensoniana.



This printed linen handkerchief of 1843 reflected the public's opinion of the Aerial Transit Company. Somewhat tongue in cheek, we suspect, it shows how the coming of the air lines would scrap other forms of transport — an idea that still has some currency.



The only known photograph of William Samuel Henson. It was taken in Lima, Peru, probably in 1866. He was then 54 years old.

for an imagination that then conceived a form of aircraft describable in the same terms which apply to a modern monoplane. More than that, he suggested for the apparatus an application which approximated the specification of a modern air line. His patent application was for more than a mere flying machine. It dealt with "Certain Improvements in Locomotive Apparatus and Machinery for conveying Letters, Goods, and Passengers from Place to Place through the Air." Unfortunately, his thinking far outreached the capability of his times to grasp.

As was to have been expected, the scribes and the printers had a field day. Fanciful stories such as the famous Glasgow hoax (in which a certain Professor Geolls of Glasgow described as fact a hair-raising adventure involving the explosion of a Henson *Ariel* while in full flight over the river Clyde), political diatribes, cartoons, and bits of doggerel dotted the British press.

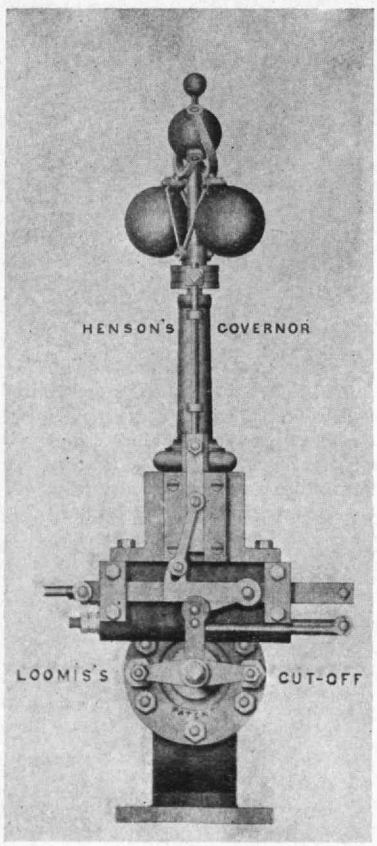
It matters not, I understand, whichever way the wind is
They'll waft you in a day or so, right bang into the Indies!
.
Or you may dine in London now, and then, if you're romantic,
Just call a ship and take a trip right over the Atlantic.

French and German magazines picked up the story but, on the whole, treated it more seriously than did the home papers. In America, the *New World* magazine (New York) printed a long and seriously philosophical discussion of the idea on Saturday, May 13, 1843.

But public mention soon died away. A dream lay buried for two generations. Newspaper commentators (circa 1910) recognized the similarity of Henson's *Ariel* with machines that were then flying. "Nothing new under the sun," was a common editorial lead. The London *Sphere* (September 12, 1909) printed a picture of the machine *upside down*, commented it was "exactly like the modern machine"! The similarities were more than coincidental.

That phase of Henson's work which rocketed into public notice in 1842 and sputtered out in obscurity when he left England in 1848 has been so well covered in aeronautical history that little will be repeated here. Henson and John Stringfellow signed a partnership agreement late in 1843. For four years they collaborated on the design and construction of two models that they hoped would fly. Both were steam driven. One (with a 20-foot span) followed the patent specification quite closely. Final attempts to launch it during the summer of 1847 on Bala Down, near Chard, were unsuccessful. The other, a modified design — smaller, more easily handled — was finally flown by Stringfellow in the summer of 1848. The detailed account of those years, however, is not for this story. Rather we have to deal primarily with portions of Henson's career which have hitherto been little known. Only lately, with the discovery of many documents and family records that have never been published, has it been possible to evaluate properly Henson's place in history.

Because so little was known of Henson, and because Stringfellow's career was more thoroughly documented by his contemporaries and by his son, F. J. Stringfellow, it is not too astonishing that Stringfellow alone was accorded the credit for the first flight of a power-driven model in 1848. As the figure of Henson emerges from its shadowy background, the fact is becoming more and more apparent that he should be given equal credit with his collaborator for the first step in the final



Henson's inventions ranged from razors to aeroplanes. This was an improvement on the common flyball steam-engine governor, patented in the United States in 1868.

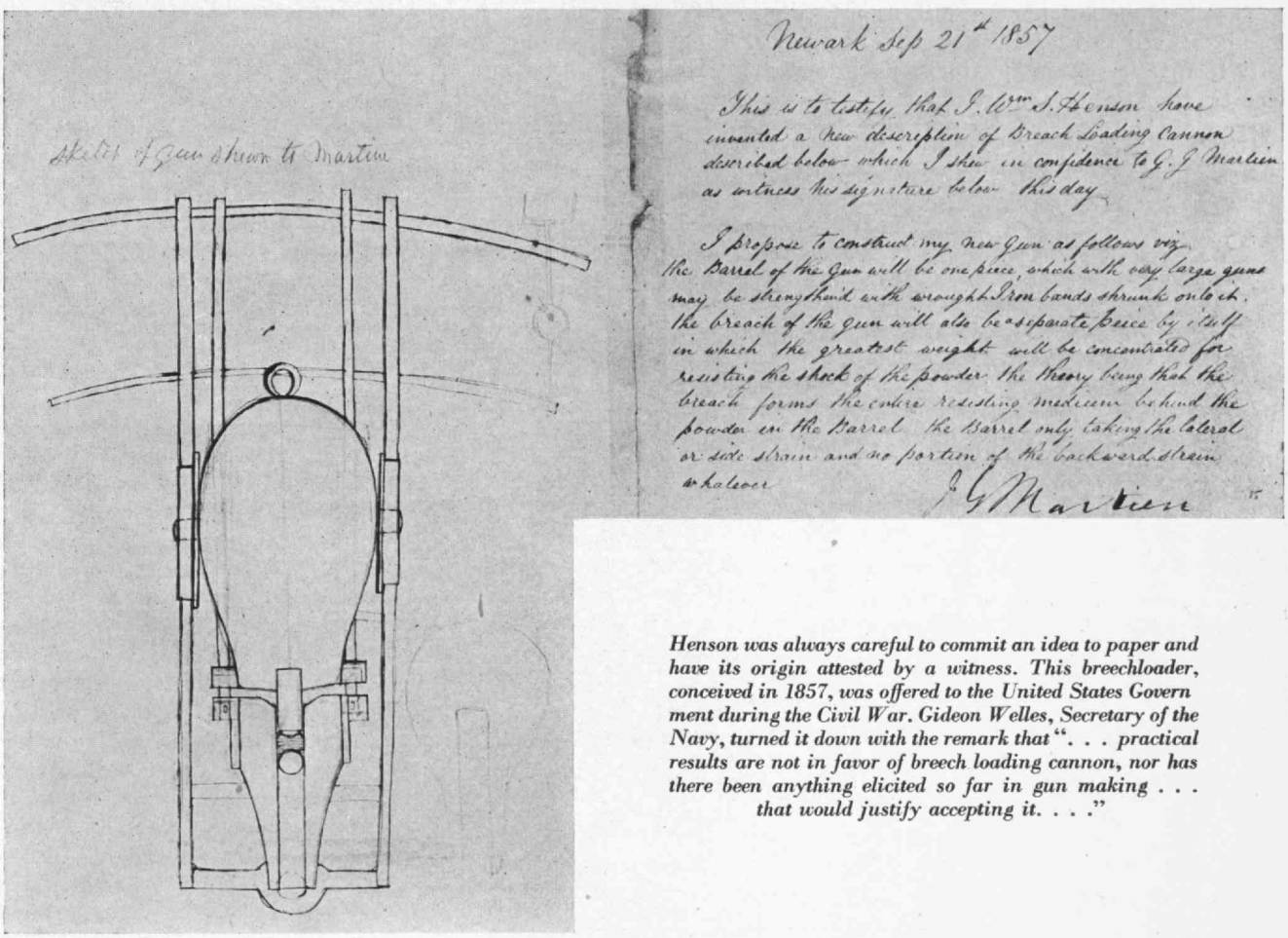
development of heavier-than-air flight, even though he was not present to witness the final triumph.

So far, many aeronautical historians have been either inept in research or downright lazy. The true facts of Henson's career have not been buried too deeply, yet everyone who has written about him has accepted without question the statements of one or two classic writers. Malcolm Ross, in an article on Henson published in *Sportsman Pilot* for July, 1930, provided a clue to the Lipsham family connection, but neither he nor any subsequent writer to date made use of the information. J. E. Hodgson, in his *The History of Aeronautics in Great Britain* (1924), gave considerable space to Henson's work between 1842 and 1848 but excused himself of comment outside that period by saying, "The writer has endeavoured in vain to obtain information as to Henson's early or later life." He continued the myth that "success . . . still seemed unattainable, and Henson, discouraged and impoverished, finally gave up the project, crossed to America a year or two later, and disappeared 'in the wilds of Texas from the ken of aeronautical science.'"

The disappearance into Texas may have been only an expression of the average Britisher's hazy notions of the North American continent more than a few miles inland from the Atlantic seaboard, or it may have had some foundation in fact. William Samuel Henson, however, never settled within a thousand miles of the plains of Texas. There is some hint that a half brother, Francis Webb Henson, may have gone to Texas. He did disappear westward, and in later years the family name turned up in the records of the Lone Star State. The connection, however, has never been established.

M. J. B. Davy, in his book, *Henson and Stringfellow, Their Work in Aeronautics* (1931), hit a little closer to the truth. He had very little to say about Henson's antecedents and work prior to 1842 except that he "is said to have been born at Leicester in 1805. . . . Of his early life very little is known." He says Henson married in 1848, emigrated to America in 1849, settled somewhere in the vicinity of Philadelphia, and died on March 22, 1888, in Newark, N. J. For that he gets only a passing grade. The place and date of death and the year of marriage are accurate, but the rest has served only to add to the general confusion. He missed the time and place of birth by seven years and some 20 miles. (Henson recorded in his diary that he was born in Nottingham on May 3, 1812, and married Sarah Anne Jones on March 4, 1848.) As will be shown presently, the acceptance of the 1805 birth date has introduced serious errors into certain assumptions that have been made regarding his career.

The alleged residence in Philadelphia can be disposed of readily. Early records of Philadelphia and Germantown disclose the arrival from Nottingham, circa 1858, of a William Henson and his wife Sarah. This man also came of a family of inventors, mechanics, experts in knitting and lacemaking trades, a fact that further misled researchers. For many years the name was associated with a flourishing textile manufacturing



Henson was always careful to commit an idea to paper and have its origin attested by a witness. This breechloader, conceived in 1857, was offered to the United States Government during the Civil War. Gideon Welles, Secretary of the Navy, turned it down with the remark that ". . . practical results are not in favor of breech loading cannon, nor has there been anything elicited so far in gun making . . . that would justify accepting it. . . ."

business in Germantown. Some of this Henson's descendants still remain there. Although they all probably had an ancestor in common somewhere along the line, the Philadelphia story has nothing whatever to do with the saga of William Samuel. It is doubtful if either family knew of the other's existence.

The relationship between Henson and Stringfellow before and during the years of their active collaboration has never been entirely clear. So little has been known of Henson's early life, and the reason for the breaking up of the partnership is so obscure, that historians have arrived at their conclusions from very slender data. Since Henson's chronology has now been established, a more nearly accurate picture of the association between him and Stringfellow can be drawn.

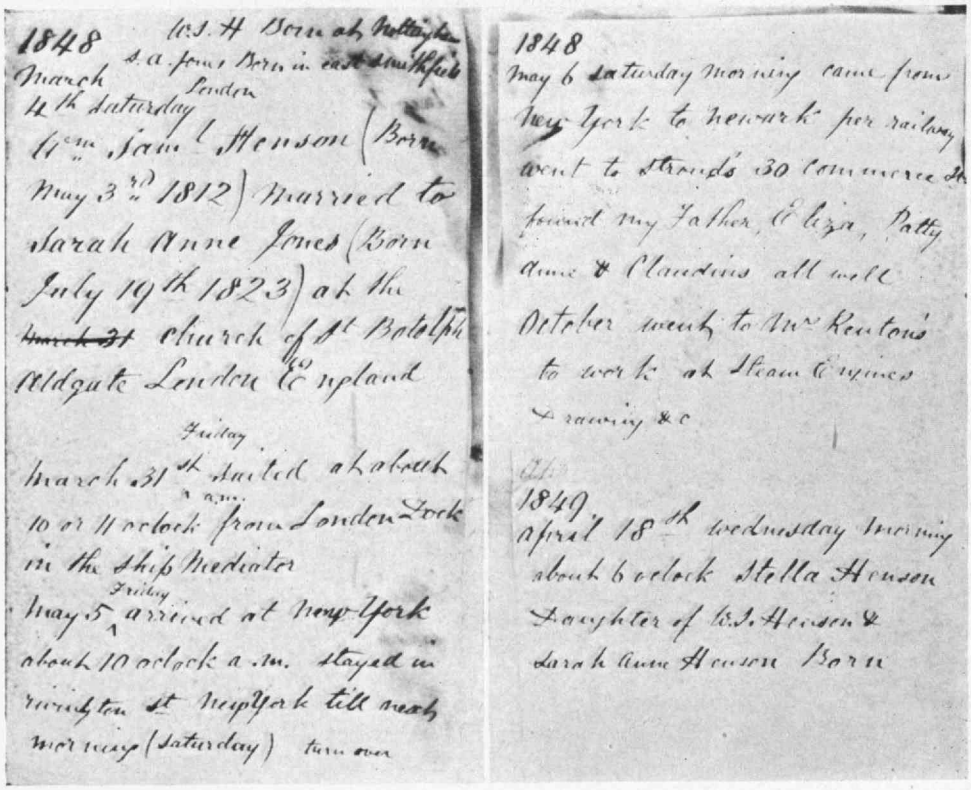
John Stringfellow was born in 1799 and moved to Chard in Somersetshire in 1820. His collaboration with Henson is stated to have begun when they met in Chard on Stringfellow's arrival. This theory now appears to be somewhat of an absurdity, because Henson was only eight years old at that time. Furthermore, it seems likely that the latter was then living with his family in Worcester and did not reach Chard until the early 1830's. Stringfellow, by then, had a well established business in Chard. Since both were mechanically inclined, it is not unnatural that the two men, the one in his early thirties and the other in his early twenties, should have been drawn together. The town was small enough to have made their meeting inevitable. Its population in 1831 was 5,141; in 1931, only 4,053.

That Stringfellow knew the Henson family long before he moved to Chard is not an impossibility. About 1812 to 1815 he was in Nottingham, apprenticed in the lace trade. At that time William Henson, Sr., was a burgess of the town. He was not only a prominent lace manufacturer but was recognized as an "inventive genius," having made a name for himself by the improvement of lacemaking and knitting machinery. It might even be that young Stringfellow had been apprenticed to him. In any case, it is not unlikely that when the Henson family turned up in Chard in the 1830's, Stringfellow came into contact with them again.

The exact date of the Hensons' arrival at Chard is unknown, but a letter exists addressed to "W. S. Henson, lace manufacturer, Chard," dated 10 July, 1835. On October 1, 1835, the British patent office issued to "Wm. S. Henson, machinist" at Chard, County of Somerset, letters patent for certain improvements in machinery for the manufacture of ornamented bobbin-net lace. Certainly young Henson and Stringfellow were both in Chard in 1835 and the chances are that their association began about that time.

It is a reasonable supposition that the complete idea for Henson's patent of 1842 did not spring full-blown overnight. Both the aerial steam carriage and the engine are so carefully detailed in the patent specification and drawings that it is fair to assume they are the end product of several years of thought and experimentation. Davy makes the statement that Henson was known to be "experimenting with gliding models, tentative constructional devices, and a light steam engine" in the year 1840. He must have been working and thinking about such things for several years before 1840, pondering the flight of birds, reading Cayley's articles in *Nicholson's Journal*, and discussing his germinating ideas for mechanical flight with his friend Stringfellow.

Stringfellow, moreover, from the height of his greater maturity and experience, may possibly have looked on such notions with amused tolerance. He certainly exhibited no great interest in flying (*Continued on page 432*)



1848 W.S.H Born at Nottingham
S.A. Jones Born in East Smithfield
March London
14th Saturday
11am Sam.l Henson (Born
May 3rd 1812) married to
Sarah Anne Jones (Born
July 19th 1823) at the
~~March 31~~ church of St Botolph
Aldgate London England

Friday
March 31st sailed about
10 or 11 o'clock a.m. from London Dock
in the ship Mediator
Friday
May 5 arrived at New York
about 10 o'clock a.m. stayed in
Washington St New York till next
morning (Saturday) turn over

1848
May 6 Saturday morning came from
New York to Newark per railway
went to Strands 30 Commerce St
found my Father, Eliza, Patty
Anne & Claudius all well
October went to Mr Kenton's
to work at Steam Engines
Drawing &c

1849
April 18th Wednesday morning
about 6 o'clock Stella Henson
Daughter of W.S. Henson &
Sarah Anne Henson Born

Two pages from the diary of William Samuel Henson which establish some dates hitherto uncertain.

Technical Force: Economic Stress

The Basic Influences of Technological Innovation on the Economy Emphasize Need for Freedom of Trade

By Ralph E. Freeman

PROGRESS in science and engineering has been, and probably will continue to be, the main cause of our rising level of living; yet technical novelties, like new shoes or a new set of teeth, may for a while be sources of acute discomfort. A new idea may disturb one's mental equilibrium by raising doubts as to long-accepted beliefs and by undermining cherished principles born of family and social tradition. "What is the question," asked Disraeli, "now placed before society with the glib assurance which to me is most astonishing? That question is this: Is man an ape or an angel? I, my lord, I am on the side of the angels. I repudiate with indignation and abhorrence these new fangled theories." Regardless of whether any important previously accepted scientific principles will be invalidated by wartime research activity, the new materials and techniques and the improved commodities and methods of production now being prepared in our research laboratories are almost certain to be disturbing when first applied. Whether the effect is to save labor or capital, to cheapen products or to improve them, or to create new articles which compete with those already in use, technical novelties upset established economic relationships and set in motion readjustments painful and costly.

By those whose interests were jeopardized, most of the important technological innovations of the past were received with "indignation and abhorrence." A few sentences from the National Resources Committee's report, "Technological Trends and National Policy," will bear out this statement. "The spread of block printing westward from China was checked by the opposition of the Islamic world. . . . The Koran was never printed in any Islamic country until a few years ago. The reason given was the belief that to touch the name of Allah with a cleaning brush made of hog bristles was blasphemy." "Turnpike companies profiting by tolls, and owners of stagecoaches were among the most active opponents of railroads. They were supported by tavernkeepers along the route of the roads, and by farmers who felt that the introduction of the railroad would deprive them of markets for horses and for hay." "One group of objectors declared that the use of gas would deprive Britannia of her ability to rule the waves, because by eliminating whale oil lamps it would destroy the whale oil industry, the nursery whence Britain drew her sons to man her fighting ships." "Beginning in Lancashire in 1776, and especially in 1779, there was a systematic attack throughout England on the use of new machines invented by Arkwright . . . which forced spinning out of the cottage into the factory."

Modern writers dealing with the economic effects of innovation emphasize the "frictions" and "rigidities" of the economic system. Trouble arises because the industrial system is not flexible enough to adapt itself readily to the alterations in costs and prices which result from technical changes. New cost conditions call for transfers of labor from one industry to another, for expansion or contraction in the output of various branches of production, for shifts in the location of industries, and for changes in the proportions in which labor and capital are combined. But because of the rigidity of the economic system, these adjustments are effected only with considerable difficulty and delay. Workers develop special skills and become rooted in particular regions. Capital in the form of durable goods cannot be disinvested and transformed, cannot be shifted into other areas except as the machines and the plants wear out over a considerable period of time. And these rigidities are in many respects becoming more intense with the progress of mechanization and the development of larger productive enterprises. The impact of the dynamic force of innovation upon the relatively fixed economic structure creates stresses and strains involving workers, investors, and the nation as a whole in serious loss of income. Indeed, the consequences may reach beyond the frontiers of the nation, creating significant maladjustments of an international character.

The smooth riding of a vehicle along a road depends on two conditions: the nature of the road's surface and the quality of the vehicle's springs. Technological innovation makes the surface of the economic road very uneven and, if we are to judge from predictions coming from "authoritative sources," there is little prospect of eliminating or diminishing the bumps. Since the shock-absorbing mechanism of the economic system is not so efficient as it might be, it looks as if we were going to be taken for a rough ride.

WHEN a new device reduces cost of manufacture by making possible the production of the same output with fewer workers, the industrial system is called upon to provide new jobs for the labor that has been displaced. This result is achieved largely through the spending of income released as a consequence of the cost reduction. If the reduction is followed by a decrease in the price of the product, the amount purchased (and produced) may increase considerably, necessitating the hiring of additional men. If, on the other hand, consumers fail to respond in this fashion and increase their purchasing of this article only very little, they will have income available to spend on other things. The

output of these other things can be enlarged only by the employment of more labor. Even though the price of the product does not fall, income will be released to provide additional employment, for profits will be higher and those who receive them will have more money to spend. In the last analysis, therefore, technological unemployment tends to disappear as the innovations increase the national income and production.

But the expansion of production may not require the services of the workers who were originally displaced. That is the crux of the matter. Even with an augmented demand for workers by the industry in which the innovation was first introduced, the demand may be directed toward men with different qualifications from those who originally lost their jobs. Cigar-making machines, for example, which caused the layoff of skilled workers, required operatives with relatively little skill, so that the old hands found themselves deprived of the advantages of many years of training and experience. Moreover, should the increased demand for labor appear in other industries, it may be directed toward workers who have entirely different capacities and skills. Under these conditions the displaced men will have to be re-educated for new occupations and, if their new jobs are located in another part of the country, the readjustment will necessitate geographical as well as industrial mobility. Even when the necessary shifts are eventually accomplished, unavoidable delays may create considerable temporary unemployment. Investigations have been made which indicate, as one would expect, that unskilled workers make the adjustment more quickly than do the skilled, and that the younger workers find new jobs more easily than do the older workers.

Whether the general expansion of output induced by technological progress will always suffice to overcome completely the effect of the reduced labor requirements in particular industries is a question to which no definite answer can be given. The fact that growth in total output during a given period in the past has not been great enough to absorb the unemployed is not conclusive evidence one way or the other. Nontechnological factors influence both employment and output. It is conceivable, however, that the increased output might require relatively less labor than was formerly used in production and that some readjustment of wages would therefore be necessary to keep at work the same number of men as before. Moreover, if technological improvements result in higher profits rather than in lower prices, the increase of production may be limited by delay on the part of corporations or their stockholders in spending the added profits. Hoarding is more likely to occur when the benefits of progress are passed to the profit receivers than when they are transmitted to the general body of consumers. However that may be, there is no doubt that adjustment to the employment dislocations which accompany technological change is a harsh and drastic process. The more numerous and the more revolutionary the changes, the greater the number of those who will be out of work.

Technical progress hastens the obsolescence not only of human aptitudes but also of industrial equipment. New firms armed with up-to-date productive apparatus are pitted against older ones which have not been able to keep up with the march of science and engineering. Though the firms with obsolete equipment have higher costs than have their more progressive competitors, the former may stay in business, finding that to accept a lower return on their investments is less unprofitable than to scrap their machinery and rebuild their plants. Hence the total productive capacity of the industry will be increased.

Two possible consequences of this situation should be noted: First, there may be overproduction. The amount produced may become so large relative to the market demand that the price of the product is depressed to a level which is profitable for few, if any, of the enterprises in the industry. Instead of being eliminated — and this, of course, is the desired structural readjustment — these high-cost, or marginal, producers are able to hang on, contributing to the output and exerting a downward pressure on the price. Such overproduction is wasteful of economic resources. In times of depression, of course, practically all industries will be in financial difficulties; but if the unprofitable condition of an industry is attributable not to general depression but to expansion resulting from technological change, a maldistribution of resources is indicated. This condition should be corrected by a movement of labor and other productive agencies out of the unprofitable sectors of the economy into others where resources are being used to greater advantage.

A second possible result of expansion in productive capacity is under-utilization. This condition arises when, by some form of monopolistic control, the output of the expanded industry is limited to an amount that can be sold at a profitable price. Under-utilization of plant and machinery is obviously wasteful. The community is deprived of the commodities and services which the idle equipment might be producing. Technological change, by enabling the industrial machine to turn out want-satisfying goods with less expenditure of materials and human effort, should result in a higher level of living, but this goal is missed to the extent that the new technology throws some of our productive equipment out of use.

Though a monopoly, through restricting the entrance of new firms into the industry, may avoid both overproduction and under-utilization, it does not thereby either stimulate technological progress or promote the proper distribution of our productive resources. To impede the entrance of new firms may delay the introduction of new techniques. Even when the concerns within the monopoly are quick to apply the results of scientific discovery, however, the price of the product will be higher than it would have been had no restrictions been imposed. The use of the product will be limited to those consumers who are able and willing to pay the higher price. In other words, the commodity is underproduced. Society does not receive the amount of this product to which it is entitled on the basis of cost of production. The high price resulting from pre-war restrictive practices in the aluminum industry, for example, is alleged to have prevented the application of this material to many uses that were economically justified. One of the primary (*Continued on page 452*)

Dr. Gatling and His Humanitarian Gun

A Case History from the 1860's Contrasts Sharply with Today's Attitude Toward Wartime Inventors

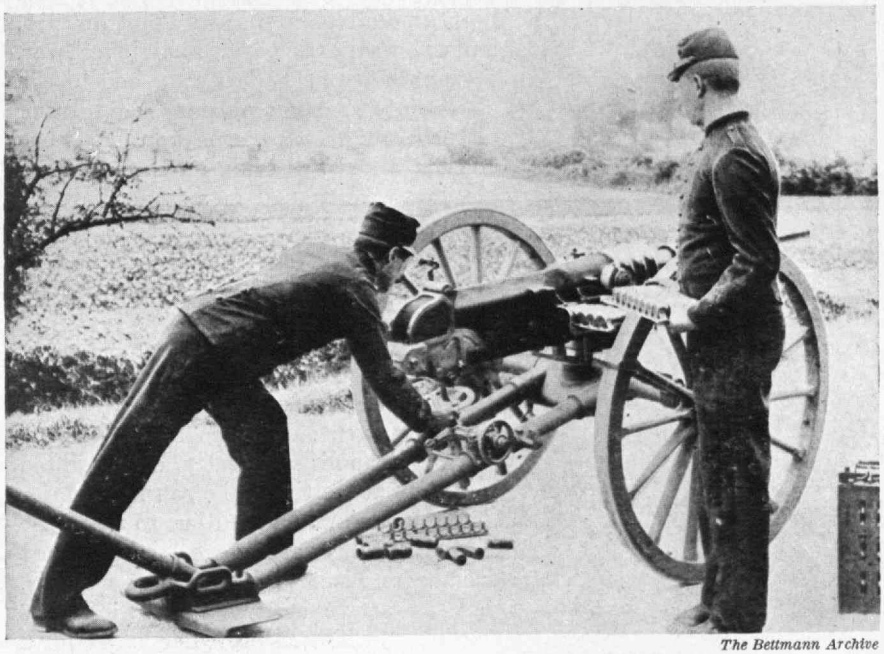
By George Fort Milton

THOUGH man is prone to error, a cynical philosopher remarked, he strives to avoid repeating exactly the same error that his grandfather made. Be this as it may, there is a refreshing contrast between the way the Federal Government treated new inventions in the Civil War and the attitude of the government today. In the Great American Conflict, surely the nation's sternest testingtime until today's struggle for survival, inventors and inventions were handled with scant courtesy by the Army's Ordnance Department. But in today's war, the government has gone to great lengths to mobilize the inventive talent of the nation. Backed by an appropriation of $73,000,000 for fiscal 1943, with $135,900,000 recommended for the next fiscal year, the Office of Scientific Research and Development, under Vannevar Bush ['16], illustrates this changed attitude. In addition, the War Production Board's Office of Production Research and Development, directed by Harvey N. Davis, is ably seeking new and improved materials for the production of goods for the war effort.

This situation represents a distinct improvement over that in Washington during the Civil War. The record of the administering of United States Army ordnance procurement during the first three years of that struggle is replete with instances of rebuff to inventions of great merit, employment of which by the Federal forces might have quickened victory. Consider the case of Richard Jordan Gatling and his later famous Gatling gun.

Gatling's forebears came to America about 1700 and established themselves in North Carolina. The inventor's father, Jordan Gatling, settled on the Meherrin River in Hertford County near Murfreesboro; he acquired some 1,200 acres of farmland and timberland and became a most successful planter. He had the inventive instinct and contrived a cotton-sowing machine. The son was born on his father's plantation at Manney's Neck on September 12, 1818. After a common school education, the boy began clerking at 15 in the Hertford County Court House. Four years later he opened a crossroads grocery store. Here, at the age of 20, he invented a screw propeller and tried to get a patent for it — only to find that the brilliant Swede, John Ericsson, had anticipated him. The following year, young Gatling devised a sort of steam drill for rice planting.

In 1844 he moved to St. Louis, where he first kept body and soul together by clerking in a St. Louis dry-goods store but spent all his spare time tinkering on his inventions. The first of a new series was a wheat drill, which he undertook to sell to the farmers direct. These parallel abilities to invent, promote, and sell marked the rest of Gatling's career. The wheat drill, for instance, he would take out to a wheat farmer and persuade the latter to make a practical deal: The farmer would set aside a part of his land for the employment of the new device. On half he would sow wheat by the old hand-planting fashion, while on the other half the planting would be done with Gatling's drill. The inventor then would take the excess wheat produced upon the machine-planted half over that of the hand-planted half, as first payment on the drill.



The Bettmann Archive

A medium-sized version of Dr. Gatling's humanitarian gun mounted on a field carriage, as an old photograph recorded it

This career of selling the wheat drill to the sons of the soil brought the next great change in Gatling's career. While on a steam packet going from Cincinnati to Pittsburgh in 1845, he was stricken by smallpox. He almost died from it, and on his recovery he determined to learn something about the art of medicine. With that in view, he entered the Indiana Medical School and then took a further course at the Ohio Medical College in Cincinnati. But

though Gatling was graduated as a doctor and was always so styled thereafter, he practiced very little. He moved to Indianapolis, married there, and carried on his experiments on all manner of machines.

Soon after the outbreak of the Civil War, Dr. Gatling began to meet the trains that came to Indianapolis bringing wounded and some dead from battlefields and camps. His examination of the dead revealed that only about a sixth had succumbed to bullet wounds but that the great majority had come to their end because of epidemics, fevers, dysentery, pneumonia, and other natural diseases incident to camp and campaign. Gatling deemed this a strange waste of soldier life, and his chain of thought led to the conclusion that if a better weapon were available, military combat could be decided with greater promptness and that therefore fewer men would die in war. In response to this initially humanitarian impulse, the physician-inventor set himself to the task of contriving a gun to shoot more bullets, to kill or wound more enemy soldiers, to shorten war.

Some of his spare time in 1862 was put on the invention of a naval ram; by the late summer, however, his ideas for a new rapid-fire gun had taken shape and the first model was ready for demonstration. It was a brilliant improvisation, a combination of existing devices — but the very first machine fired over 200 rounds a minute. This capacity represented an amazing enlargement of the fire power of the infantry small arms of the day, just then in transition from muzzle-loading to breech-loading type.

In September, 1862, Gatling demonstrated his new weapon at Indianapolis before a mixed group of Army officers and civilians. Next he commissioned the machine shop of Miles and Greenwood in Cincinnati to build six Gatling guns to his specifications. There ensued the usual story of delay and disappointment. Miles and Greenwood's machine shop burned to the ground, and the first machine guns were destroyed. The inventor persisted; at length a new gun was turned out; and in October he took it to Washington to put through his application for a patent and, even more important, to sell the new gun to the Ordnance Department of the United States Army.

Gatling knew the ropes at the Patent Office, and on November 4, 1862, there was issued to him Patent No. 36,836, entitled, "Improvement in Revolving Battery Guns." The object of the invention, he stated, "is to obtain a simple, compact, durable, and efficient fire-arm for war purposes, to be used either in attack or defense, one that is light when compared with ordinary field-artillery, that is easily transported, that may be rapidly fired, and that can be operated by few [*sic*] men."

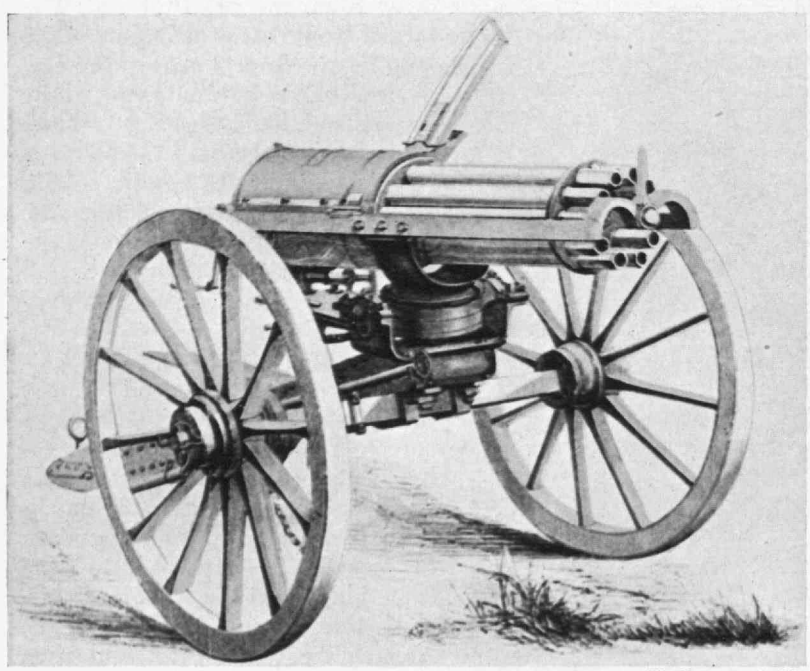
The patent application went on to describe the technical principles involved. "The invention," it related, "consists in a singularly-constructed revolving lock cylinder or breech, in combination with a grooved carrier and barrels all rigidly fixed upon the same shaft, and all of which revolve together when the gun is in operation, the locks and grooves in the carrier and the barrels all being parallel with the axis of revolution."

It also claimed invention "in the novel means employed in cocking and firing the gun without the use of a trigger by means of the inclined plane on the rear edge of the ring, which surrounds the forward end of the lock cylinder." In addition, Gatling emphasized the novelty in use of the "inner tubes" which contained the locks, "to press the cartridge-chambers firmly against the rear ends of the barrels while being discharged, and in the outer casing and disk, which protects the locks from injury."

His ease in getting the patent was no harbinger of success with the Ordnance Department. Here Gatling was given the well-known run-around, principally because of the dotage of the chief of ordnance of the Army. This was Brigadier General James Wolfe Ripley, who had been born in 1794, had been graduated from West Point in 1814, and who was participating in his fourth war.

Apparently he had already had his fill of inventors, humanitarians, and other disturbers of his paper-work routine. When Gatling asked a hearing on the merits of his new weapon and an actual trial and test, the general declined. He was much too busy fighting a war to be bothered with inventors' experiments! That such a man could have been in charge of Army ordnance — particularly at such a crucial time — seems amazing, yet he continued chief until August, 1863.

At any event, Gatling left Washington for Indianapolis a greatly disappointed man, but at Baltimore he ran into Major General Benjamin F. Butler, to whom he poured out his tale of woe. Butler, just back from his exploits at New Orleans, took an active interest in Gatling's invention and himself placed an order for a dozen of them which were to be used by his own command. (*Continued on page 444*)



The Bettmann Archive

Embodiment of Gatling's effort "to obtain a simple, compact, durable, and efficient fire-arm for war purposes" was this ten-barrel, one-inch gun.

The Dilemma of Sympathy

Psychic Environment of the Worker Must Be Reckoned with As a Factor in Production

By Paul Cohen

"PEOPLE don't seem to understand you got feelings. When you work and fight together for a long time you hate to split up. It's like something going out of your life." That was the reported reaction of a pilot in the late American Volunteer Group in China (the Flying Tigers) when he learned that the organization was being disbanded and that most of its members were to be absorbed by the United States Army Air Forces. Like a good officer, he probably swallowed his disappointment quickly and went to work with all his abilities under the new conditions. But more graphically than most men ever do, he had described the first and often lasting feeling of resentment that most of us have experienced when some move made without our knowledge or consent has ruined plans, separated friends, or injured prestige.

Certainly military forces cannot make formal provision for soothing injured feelings when issuing orders or changing organizations, but, on the other hand, they are acutely conscious of the importance of individual and group attitudes. In marked contrast to industry, military organizations have long had an extensive and frequently used vocabulary to describe such attitudes: morale, *esprit de corps*, spirit, confidence, *élan*. To control these attitudes, they also have many and ancient traditions: concepts of duty, obedience, loyalty, and, on the reverse side, impartial justice, and reward and honor for outstanding performance. This preoccupation with intangibles is justified by the decisive effect they often have on results.

The saying, "The moral is to the material as ten to one," is attributed to Napoleon. By a somewhat roundabout route, industry is reaching substantially the same conclusion. Increasingly, the study of industrial fatigue, the term which has come to cover everything tending to reduce worker output, be it absenteeism or sunstroke, is stressing that the worker's mental state rather than his physical surroundings is the determining factor in production. Thus, air conditioning, fluorescent lights, tiled showers, or the prospect of steady employment will help in keeping a labor force contented, but they will not help nearly so much as a general feeling that the foremen are honest and competent or that promotions will follow with some certainty after the demonstration of the required ability. It may be added that such feelings are not now conspicuously widespread among labor.

When large-scale investigations into the factors influencing the efficiency of labor were started during the first World War in Great Britain, Germany, and the United States, an unexpected and enormous demand for munitions, to which the first reaction had been longer hours, had stressed labor so much that physical exhaustion, accidents, and absenteeism were assuming the aspects of national problems. Attention quite naturally turned first to the physical factors, for here were many obvious conditions which even a semienlightened selfishness could not countenance. How long should the work week be? was one of the first questions asked. How much could a worker lift and how often? What went on in his muscles as he grew tired? How warm should the working space be and at what humidity? This conception of fatigue was one which industry could readily understand and act upon. Machines and materials performed best under certain conditions, which were discoverable by logical and objective study. Why not people? Management came to realize that noise could affect output; that it pays to give a draftsman, or for that matter a carpenter, all the light he needs; that there is an important relationship between diet and efficiency.

By and large, industry has quite willingly accepted the responsibility for maintaining good working conditions. Whole mines are now air conditioned. Vitamins are fed to workers requiring particularly keen vision, and salt capsules to those working in extreme temperatures. The task of manufacturing such items as safety goggles and gas masks has become a fairly good-sized industry in itself. An African copper-mining company found that when its native help were fed a balanced diet — the first time in their lives that these men had ever enjoyed such an experience — their resistance to disease and their working capacity were almost doubled. It may also be pointed out, without belittlement, that an intelligent dairyman will do as much for his cows. As the literature on industrial medicine indicates, interest in the worker's well-being has now extended far beyond the control of industrial hazards and even beyond the confines of the factory. Nevertheless, one may assemble an imposing list of managements that, after providing good rates of pay and adequate working conditions, and after exhibiting what seemed to them a sincere interest in their personnel, have still failed to gain the co-operation of the employees, who have grumbled, or slowed down, or deliberately walked out in strikes disastrous to both sides. Somehow the basic causes of discontent had been left untouched.

Perhaps, as F. J. Roethlisberger suggests in his *Management and Morale*, the root of the trouble is the "oversimplified theory of human motivation" to which industry holds, at least officially. "An industrial organization is assumed to be composed of a number of individuals entering into relations of contract for the promotion of their own individual economic interests." If a man is, therefore, paid according to the value of his

job and at a rate to which he formally agrees, if he is not overworked, and if he is given safe and comfortable surroundings, he should be happy. Except that, quite frequently, he isn't. The pay envelope may take care of economic man, but there is also man the social animal, who needs the liking and respect of his fellow men, including his superiors; who nurses ambitions and hopes of leadership; who resents unfair or callous treatment even about the trivia of existence; and who wants, though often unconsciously, the feeling that his work is necessary and that he has a secure and definite niche in the social structure. At the end of an article in a technical magazine on the manufacture of a molded-plastic antenna housing was a paragraph stating that production almost tripled when the employees learned (and not through their employers) that their housing was being used on most American bombing planes and that it had been carried by the planes which made the first bombing raid on Tokyo.

Intangible incentives are scarcely a recent discovery, since they have been among the main factors in making armies, churches, and governments function over longer periods and under more difficult conditions than most industries can claim. Nor are they secret even to industry. But as industries have grown in size and as the formal organization has submerged individual personalities and complaints, the tendency has been to lose sight of the fact that man is many other things besides a logical, reasoning being. Few trends during the past decade appear more significant to the future of labor relations than the upsurge of interest in, and objective investigation into, the social and psychological problems of the worker.

As a note on the general knowledge of the effect of the worker's mental state on his output as it existed in 1927, it may be illuminating to relate how in Chicago the Hawthorne plant of the Western Electric Company began the now classic series of experiments which it carried on between that date and 1932. In line with a long-continued policy of providing good working conditions for its employees, the company, in collaboration with the National Research Council, undertook a study to determine the relation between intensity of illumination and efficiency of workers, measured in output — seemingly a straightforward experiment on the physical aspect of fatigue. But the investigators (could it be that they were more thorough or at least more skeptical than some of their predecessors?) found no clear-cut relationship. Output went up when the illumination was raised for the test group. It also went up for the control group whose light level was held constant. Output also went up when the group under test was told that more light was being provided, although the light intensity was actually not changed.

Other such puzzling results have been reported. In one case, a group of women workers in a textile mill were given a short rest pause twice a day, and their output was measured. It increased. When the workers were returned to the original conditions as a check, however, output remained at the higher levels. The investigators began to realize that their subjects, far from being static elements in the experiment, were themselves reacting on the situation in a manner which totally obscured the effects of the variables which the investigators fondly thought they were controlling. The women liked their new role; they enjoyed the attention paid them by the investigators and the interest shown by the other workers. No doubt they appreciated the thought being given to their personal comfort. Thus stimulated, they devoted a new attention to their work, and although making no conscious attempt to speed up, they succeeded in raising their production. As the Hawthorne observers put it, the laboratory technique of varying one element at a time was impractical if not impossible; it was necessary to study the phenomena *in situ* as do the doctor and the biologist most of the time, paying due attention, in fact paying most attention, to the motivation, social relations, and emotions of the worker rather than to his physical surroundings.

No more or less than any other human being, the industrial employee exists not only in a physical world of matter and energy but also in a psychological and social environment — his private worlds — and in this country at least, where working conditions have by and large advanced to the stage where major physical obstructions to good performance have been removed, changes in these private worlds have outstanding effects on efficiency. For instance, during the five years it was under observation, the relay assembly group at the Hawthorne plant continued to increase output more or less steadily until it was 30 per cent above the starting point. Yet, according to the book, (*Continued on page 438*)



American Bridge Company

Apprentice welders at work under the supervision of a training instructor

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

Medalist

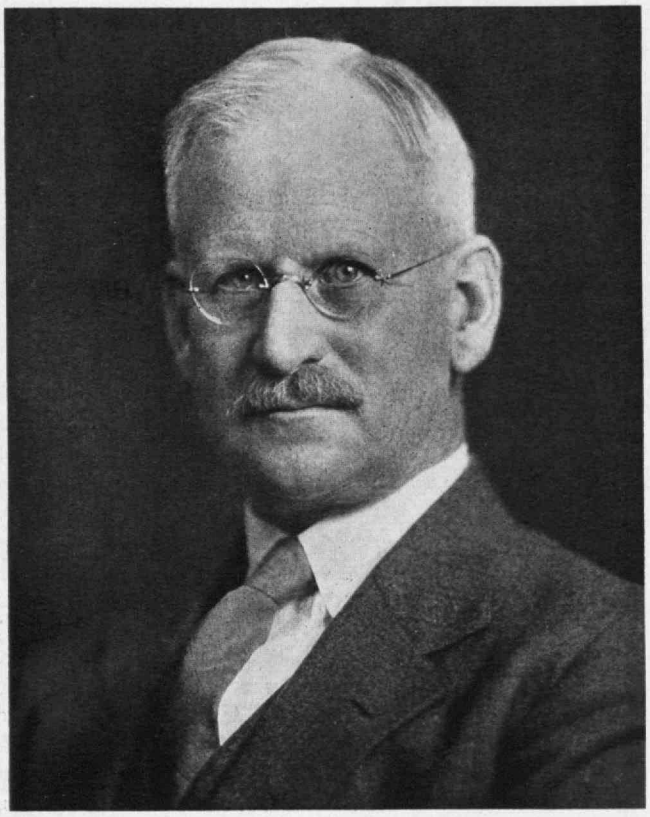
FOR outstanding contributions to the field of food technology over a period of many years, the Nicholas Appert Medal is being awarded this month to Samuel Cate Prescott, '94, Professor of Industrial Biology, Emeritus, and former Dean of Technology's School of Science. The medal was established in 1941 by the Chicago section of the Institute of Food Technologists, and the medalist is chosen by a jury of distinguished technologists representing various divisions of the food-processing industry. Eligibility for the award is based on pre-eminence in the field of food technology and on contributions to the progressive development of food manufacture and processing.

Dr. Prescott's notable career in food research began while he was still an undergraduate at Technology, when he started investigations on the chemistry of foods. His earliest contributions included methods of safeguarding the purity of milk supplies, the advancement of techniques for canning meat, and purification of water by chemical compounds.

As a division chief in the United States Department of Agriculture and later as an Army officer, Professor Prescott was active during the first World War in the development of methods for dehydrating food destined for shipment to our forces overseas. After the War he devoted himself to an exhaustive study of the application of low temperatures for food preservation, an investigation which led into the field of quick freezing. During the formative years of this new industry, his technical counsel had an important bearing on the solution of many problems.

Since his retirement last year, Dr. Prescott has been a consultant to the dehydration committee of the United States Department of Agriculture as well as to the research laboratories of the National Canners Association.

It was as dean of the School of Science and head of the Department of Biology and Public Health that Professor Prescott in 1937 sponsored the first international Food Technology Conference, which was held at M.I.T. In June, 1939, when the conference again came to Technology, the Institute of Food Technologists was established. In recognition of his contribution to food technology and the success of the conferences, Dr. Prescott was elected the first president of the Institute of Food Technologists and is now a member of its council.



Samuel C. Prescott, '94

By Ballot

OFFICERS to serve the Alumni Association for the year to come, as elected in recent balloting, are: Francis J. Chesterman, '05, President; Raymond H. Blanchard, '17, Vice-president for two years; James A. Cushman, '03, and Alf K. Berle, '27, members of the Executive Committee for two years. Walter J. Beadle, '17, Donald F. Carpenter, '22, and Francis A. Barrett, '24, have been elected members of the Institute Corporation for five-year terms, and Irving W. Wilson, '11, has been elected to the Corporation to complete the term of the late Alfred H. Schoellkopf, '15. The contest for membership on the National Nominating Committee eventuated in the election of Samuel C. Prescott, '94, to represent District 1; Orville B. Denison, '11, District 2; Lauren B. Hitchcock, '20, District 4; and Frank Maguire, '17, District 5.

Chosen representatives of their respective classes on the Alumni Council were Samuel S. Dearborn, '84, William W. Lewis, '89, Samuel C. Prescott, '94, Miles S. Sherrill, '99, Eugene H. Russell, Jr., '04, Arthur L. Shaw, '09, H. B. Richmond, '14, George W. McCreery, '19, Francis A. Barrett, '24, Eric A. Bianchi, '29, Henry B. Backenstoss, '34, and Robert C. Casselman, '39.

Men and Metals

ELECTION of members of standing committees was prominent in the business of the 232d meeting of the Alumni Council, held at the University Club in Boston on the last Monday in April. Speaker of the evening was Robert S. Williams, '02, Head of the Department of Metallurgy and Deputy Dean of Engineering at

Reunions in June

Several Institute classes held their reunions for 1943 during the Alumni Day festivities in January. Others have plans for meetings this month, the schedule being as follows:

1888 — The Country Club, Brookline, Mass., June 7
1893 — The Country Club, Brookline, Mass., June 5
1903 — Somewhere between New York and Boston, June 25 to 27
1908 — Oyster Harbors Club, Osterville, Mass., June 18 to 20
1918 — Weekapaug, R. I., June 18 to 20

the Institute, who surveyed recent developments in metallurgy and discussed some of the probable future applications of them. In the absence of President Francis A. Barrett, '24, Harold Bugbee, '20, Vice-president of the Alumni Association, presided at the meeting. The role of Charles E Locke, '96, Alumni Secretary, who was kept away by illness from the first meeting which he had missed in over a decade, was performed by Ralph T. Jope, '28, Treasurer.

To the Committee on Historical Collections, Robert P. Bigelow, Professor of Zoölogy and Parasitology, Emeritus, was elected for five years; to the Committee on Audit and Budget, H. Leston Carter, '08, for three years; to the Committee on Honorary Members, Edward S. Chapin, '98, for three years; to the Nominating Committee for Departmental Visiting Committees, Bernard E. Proctor, '23, and Royal B. Wills, '18, for three years; to the Alumni Fund Board, Edward Pennell Brooks, '17, for five years. The Assemblies Committee — consisting of Larcom Randall, '21, chairman, John T. Rule, '21, James Donovan, '28, and Robert C. Casselman, '39 — were re-elected for one year. Nominees for re-election to departmental visiting committees for two years were presented by Mr. Bugbee, and re-election of them was recommended to the Corporation.

Reporting informally on the work of the Committee on Historical Collections and of the Alumni Fund Board, H. B. Richmond, '14, chairman of the two organizations, said that the first has found war conditions a serious bar to the continuation of its normal activities, but that the committee is most fortunate in that Miss Julia M. Comstock is assembling and correlating historical material for future use. The Fund Board, Mr. Richmond reported, is gratified by the fact that in the three years of its life, the M.I.T. Alumni Fund has grown to be the fifth largest in the country. Commenting on the able work of Henry B. Kane, '24, Director of the Fund, Mr. Richmond urged Alumni to continue their efforts toward the goal of 10,000 contributors and $150,000 in contributions.

Dean Williams, describing the rapid advances being made in the science of metallurgy as a result of the necessity for securing satisfactory alternative materials for many of the strategic metals now urgently needed for war work, surveyed various practical developments which have thus come about. New techniques for the hardening of steels and the devising of methods of precision casting were among the important advances which he discussed.

Citing the use of powders under heat and pressure to make many small gears and sleeves, Dean Williams declared that the development of powder metallurgy has aided the war effort to a very great extent through the saving of valuable time in machine-shop operations. The willingness of industrial organizations to contribute men, money, and materials for the perfecting of new alloys, Dean Williams said, has contributed notably to the effective prosecution of the war.

Visiting Committee Report

THE Committee on the Department of Electrical Engineering * met in New York on January 26. Also present at the meeting were Edward L. Moreland, '07, Dean of Engineering; Harold L. Hazen, '24, Head of the Department; Carlton E. Tucker, '18, Professor of Electrical Engineering; and James R. Killian, Jr., '26, executive assistant to President Compton. The lengthy discussion, which reviewed the problems of the Department in considerable detail, is here summarized.

The Committee were informed that Professor Hazen had been appointed chief of division 7 of the National Defense Research Committee and that Professor Tucker is now executive officer in active charge of the Department. There is a nominal teaching staff of 75 in the Department. Of these, 20 are on leave of absence or are working almost full time on war activity. The extent of this war work, both in a consulting and in a research capacity, is most extensive and indicates the abilities of the staff, who are looked to for expert assistance by the Army and the Navy, the National Defense Research Committee, and others. The Committee noted with great satisfaction the reliance which is placed upon these men, indicating the high regard in which the Department is held.

The absence of many of the high-ranking members of the teaching staff has thrown a considerable load on the balance of the staff, but the younger men are carrying on effectively. The individual load is heavy, but there is no indication that the present procedure is not satisfactory. One of the problems of the Department was the uncertain size of the freshman class, making the required number of instructors difficult to determine.

Some senior and many graduate students are doing research connected with the war effort. Each student works as one of a group and writes up some one phase of the project. Thesis credit is given for this group research, in place of the usual required individual investigation. Present indications are that this procedure is quite satisfactory and has the advantage of impressing upon the student the importance of being able to work as one of a team.

* Members of the Committee for 1942–1943 are Francis J. Chesterman, '05, Chairman, Harry P. Charlesworth, '05, Harold S. Osborne, '08, Philip H. Chase, '09, Vannevar Bush, '16, Lee A. Du Bridge, and Reginald E. Gillmor.

The study made last year relative to broadening the power option to include more electronic applications resulted in the development of a new option, electronic applications. This option, started last June, is now in full operation and filling a real need. Further consideration should be given to the need for modification and broadening of the power option, but the progress made so far is in the right direction. In addition to the new option, three subjects have been inaugurated for special wartime needs. These subjects are designed to fill the demands for electrical engineers especially trained in electronics and in ultrahigh-frequency techniques. The course in ultrahigh-frequency techniques had approximately 75 men and was expanded to include the first and second terms of the fourth year, and for the Class of 1944 it has been extended to include three terms. Another of these new courses is instrument electricity, primarily designed for students not majoring in Electrical Engineering. These students are made more valuable to the war effort because of this course. The third subject, elements of electrical communications, is also primarily designed for students outside of the Department who will receive commissions in the Signal Corps. It presents the fundamentals of electrical transmission.

Because of draft regulations, work assignments in the co-operative courses have been regretfully abandoned for the duration because of the difficulty of carrying on outside work in present circumstances.

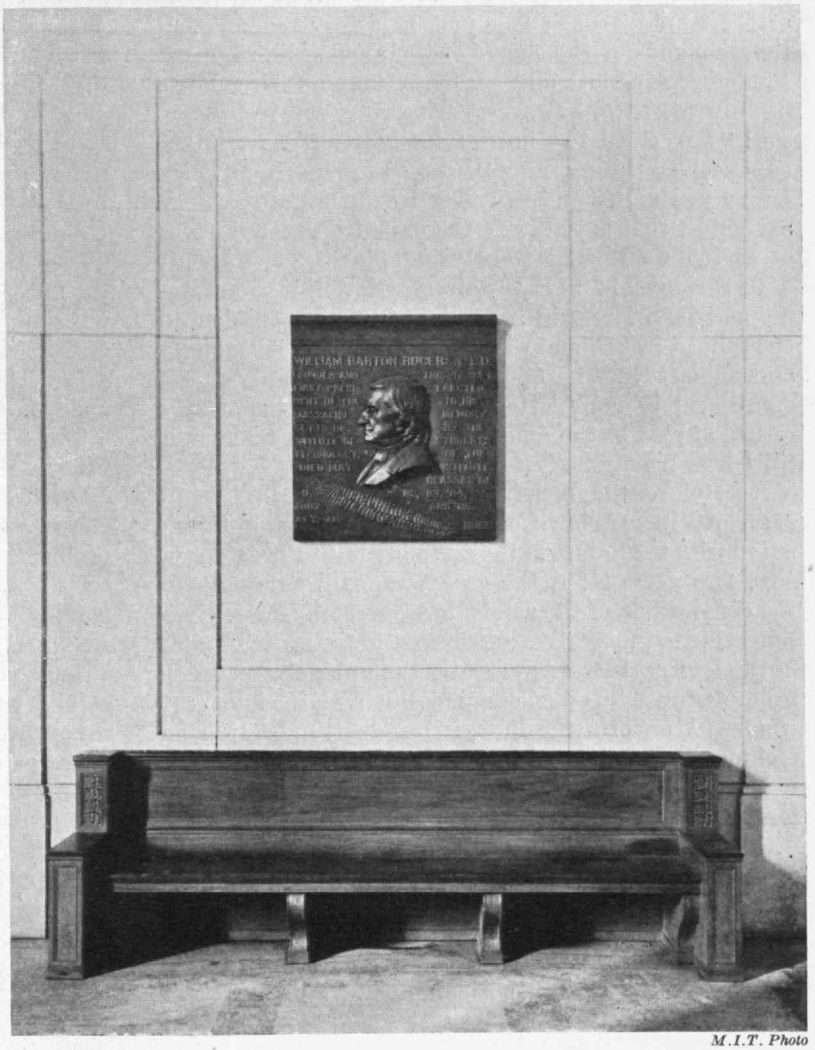
A great deal has been done in ultrahigh-frequency, particularly in the development of apparatus and teaching material for about 70 engineering schools. The Department, in addition, is supervising the construction of the necessary equipment for about 20 to 25 of these schools. Louis F. Woodruff, '18, Associate Professor of Electric Power Transmission, and three others have completed a new book, entitled, *Ultra-High-Frequency Techniques*. Approximately 14,000 copies have already been sold.

Working on a co-operative basis, the Department has completed three volumes of electrical engineering texts. These books, published by the Technology Press in conjunction with John Wiley and Sons, Inc., are especially valuable from many standpoints. Not only are they worth while in themselves but the writing of them has developed much useful material in circuit theory, magnetic fields, and their applications. In the discussion of these matters interdepartmentally, still closer co-ordination has arisen between the Electrical Engineering and the Mechanical Engineering Departments, which has been of benefit to both Departments.

After reviewing some of the material given by the Department, the Committee felt that further instruction in tube design — especially tube designs suitable for mass production with uniform characteristics — might be of value. The same recommendation was made for transformer design. While this subject is covered somewhat in the course in electrical implementation, the suggestion was made that the approach to be utilized in the further work might be from a synthetic rather than from an analytical point of view.

It was apparent that in the immediate future the Department would be called upon to teach advanced courses in communications to the Army and Navy men. The Committee felt it desirable for the Department to develop these courses and such others as were indicated to be especially valuable, and recommended that the staff be used for this purpose to the maximum possible extent. The Committee thought it would be wise in the development of these courses to specialize on the advanced work which the Department is well qualified to do — but only to the extent that the job can be well done.

The Committee expressed appreciation of the frankness and thoroughness with which the members of the Faculty discussed the problems and the outlook for the Department. They recorded their approval for the thoroughly sound methods which are being used in approaching various problems and for the results that have been obtained.



The memorial tablet to William Barton Rogers, founder of the Institute, in the rotunda of the building which bears his name

M.I.T. Photo

GRANDFATHER OF FLIGHT

(*Continued from page 422*)

prior to the year of Henson's patent application. Then, carried along by the enthusiasm of the moment, and probably absorbing from Henson more and more of the realization that success might be within their grasp, he fell in completely with Henson's ideas and later lived to reap the lion's share of the credit.

Latterly, three hitherto unknown letters from Stringfellow to Henson have turned up. They were written between April and July of 1845. (At that time Henson was living in London, Stringfellow in Chard.) They discuss many of the details of the construction of the models and the engines then under way and also disclose certain of the business arrangements between the partners. Regardless of their content, their tone is significant. They are not the letters of a master disclosing his ideas to a pupil. In spite of the age difference between the two men, the letters are rather those of an assistant toward his superior. Ideas are advanced with figurative question marks, and Henson's advice on this or that point is sought. The letters indicate certainly that Henson was the leader both in technical and in commercial matters.

On the business side, one point of interest comes out. When Henson and Stringfellow made their joint partnership agreement in December, 1843 (after the failure of the Aerial Transit Company), history records that they bought out the shares of their erstwhile partners, Frederick Marriott and D. E. Columbine. In a letter of July 25, 1845, however, Stringfellow wrote to Henson: "I received two notes from Marriott . . . in the one received this morning there was a proposition which I give you under and to which I believe Columbine is agreeable, that is to divide the patent interests into 12 — as follows Henson 4/12 Columbine 4/12 Marriott 2/12 Stringfellow 2/12 — this Marriott thinks equitable and just. I refrain from giving you my opinion on the subject as I should wish your opinion on it candidly and unbiased. He also purposed a meeting same as you mentioned in your letter and wishes my answer per return of post but of course I shall give him no answer till I hear from you."

Heretofore the belief has been that the Henson-Marriott-Stringfellow-Columbine syndicate was terminated with the failure of the company late in 1843. Actually, two years later, the group was still arguing over the distribution of the assets. Moreover, the letter gives some clue to the relative importance of the contributions of the four partners. Apparently Columbine's work as a promoter put him on an equal footing with the inventor, whereas Marriott (the lobbyist) and Stringfellow (the technical assistant) had to be content with only half as much each. All evidence indicates that the basic ideas for both the aeroplane and the engine were Henson's. Stringfellow's contributions — at least until the end of the 1840's — now appear to have been largely those of a constructor working under the general direction of the inventor.

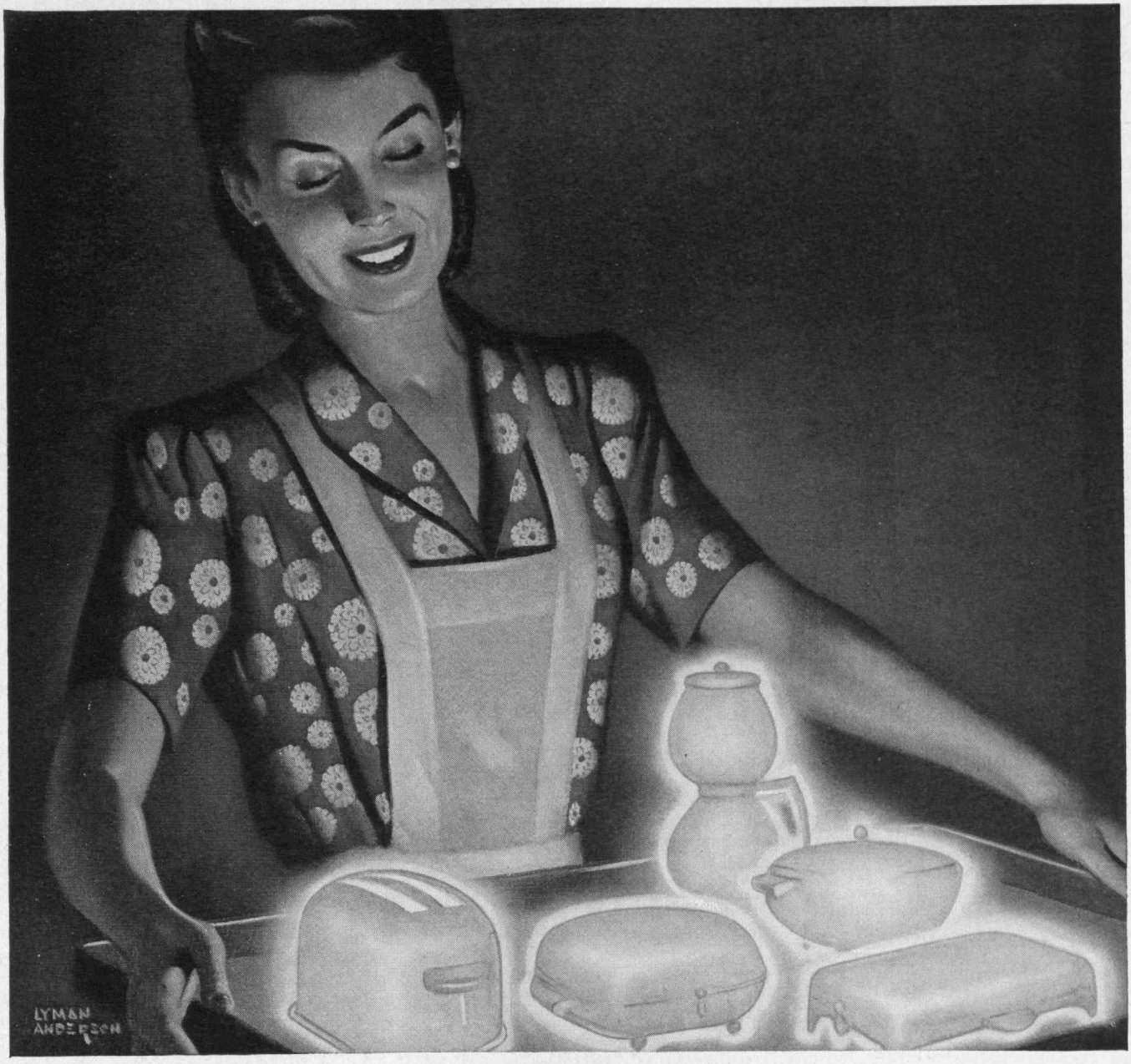
It seems probable that Henson played a much larger part in the design and construction of the successful power-driven model aeroplane than history has accorded him. From the letters the fact is clear that two models were under construction as early as 1845. Stringfellow wrote in July that year: "I am not waiting for the silk as I have done nothing to the second pair of propellers for the large machine and am sorry to say I have been otherwise employed for the last week, that is, in repairing a Disaster. Last Monday week in the morning I found the trap fallen on the floor one of the cords having broken in two at a point where there appeared to be a little iron mould. Like all other bad jobs it might have been worse. I dont find any damage done to the frame work of the Machine, only the Boiler broken from its bearing and the dome and steam gague bulged a good deal. I had the frame and propellers of the small machine underneath it at the time which was literally smashed to pieces and I have now been spending my time for more than a week on it. I have succeeded in making it full as strong if not quite so light and neat."

Frederick W. Brearey stated in the *Popular Science Review* in 1869 that the successful Stringfellow flying model of 1848 was begun in 1846, some two years before Henson's "disappearance." The records of the unsuccessful experimenting on Bala Down during 1846 and 1847 indicate that the *larger* model was used throughout. The final modification of the *smaller* model and its power plant must have been carried out during the latter part of 1847 and the spring of 1848.

According to F. J. Stringfellow ("A Few Remarks on What Has Been Done with Screw-Propelled Aero-Plane Machines from 1809 to 1892" — Chard, 1892), the first successful flight of the smaller model took place in June or July of 1848, or within three or four months of the time of Henson's departure from England. Stringfellow probably worked out the launching method (clearly his own idea and one which undoubtedly contributed an essential element to the successful flight) during the spring of 1848, but in view of the length of time that it took in those days to develop and test engines, boilers, propellers, and so on, it is reasonably certain that Henson had a considerable hand in the actual construction and testing of the smaller model, which finally flew.

The histories state that he gave up in 1848, implying that he slunk off the stage to vanish in America. Why — when success was so close at hand? He doubtless had other reasons aside from discouragement over the problems of mechanical flight. In almost 10 years of aerial experimentation he had probably let his lace-making business go completely to pieces. How he managed to keep going that long is still a mystery — although his father undoubtedly had a hand in the business. Now the son was contemplating marriage, and surely little financial return seemed likely from the abortive experiments on Bala Down. His father is known to have been living in America at the time and had probably urged his son to come out and to take advantage of the opportunities of the New World. Further, the family records hint of a violent quarrel with Stringfellow. When it occurred and over what issue are still unknown, but Henson's opinion of Stringfellow in his later years made such an impression upon several of his children and grandchildren that two generations

(*Continued on page 436*)



Every wife is still a bride-to-be

AT the end of the war American wives will want to be brides all over again, start housekeeping afresh, refurnish their homes and refurbish their lives with sparkling new possessions for happy living. Not only new articles to replace the old and worn, but entirely new models that make it more fun to keep house. Automatic kitchen equipment, electrical appliances that make better waffles, coffee, toast . . .

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Today the copper industry is producing only for war. No copper is available for anything else. But post-war planners with specific problems in metals are referred directly to the Revere Executive Offices in New York.

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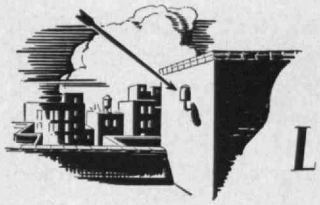
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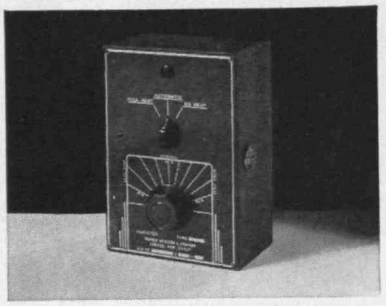
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The Webster E-4 Moderator System is a steam heating control that anybody can understand. There are just four control elements—an Outdoor Thermostat, a Main Steam Control Valve, a manual Variator and a pressure Control Cabinet. These elements, plus small metering orifices to assure each radiator its share of steam, result in the highest expression of comfort and economy in modern steam heating.

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ARMY E NAVY

Webster
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GRANDFATHER OF FLIGHT

(*Continued from page 432*)

later they clearly remember that the name "Stringfellow" was forbidden in the Henson household and that William Samuel took frequent occasion to denounce his former partner as one who had robbed him of his ideas and who had taken credit for them.

For whatever the reason, Henson broke off his work, married, and emigrated to America, where he subsequently lived for 40 years. Heretofore, no one has been exactly certain as to the date of his departure for America; his diary states, "Friday, March 31st [1848] sailed at about 10 or 11 o'clock a.m. from London Dock in the ship Mediator. . . ."

He landed in New York on Friday, May 5, 1848; went directly to Newark, where his father was already established; and settled down to the business of raising a family and earning a living. On the whole, he was more successful at the former than the latter. He and Sarah had seven children, five of whom survived early childhood — one of whom is still alive. Henson became a citizen of the United States on November 8, 1853.

The directories of the city of Newark, beginning with the issue of 1850 down to that of the year of his death, 1888, carried continuous record of his residence there. (The names of his widow and some of his sons and daughters appeared as late as 1907.) Henson classed himself variously as "engraver," "mechanical draftsman," "artist," and "civil engineer." During the 1850's he worked for a time for the Newark Machine Company and for one year listed himself as the "William S. Henson & Co., Machinists and Engineers, Union Building, Corner of Mulberry and River." Evidently this venture was short lived. The following year, he appeared simply as "Draftsman, Newark Machine Company."

From 1867 on, he listed no business connection. He considered himself a consulting engineer, an enterprise that was not always profitable. There were times when his family was said to have been in somewhat straitened circumstances. At one period, probably from the spring of 1864 to late in 1866, he lived in Lima, Peru. Why he was there or what he was doing are not accurately known. Letters and other family records indicate that he had some work there with an engineering project, probably connected with the construction of a bridge or with some sort of mining venture. In January of 1869, a United States patent covering a centrifugal screw pump was issued jointly to Henson and to a John H. White of Lima, Peru.

There is little evidence that Henson's interest in aeronautics extended beyond the first few years of his residence in this country. Among his papers has been found a pamphlet by Solomon Andrews, dated July 22, 1848, proposing an Association of Inventors of Aerial Devices. Andrews was then experimenting with odd-shaped balloons at Perth Amboy, N. J. Whether or not the two were ever in communication is not known.

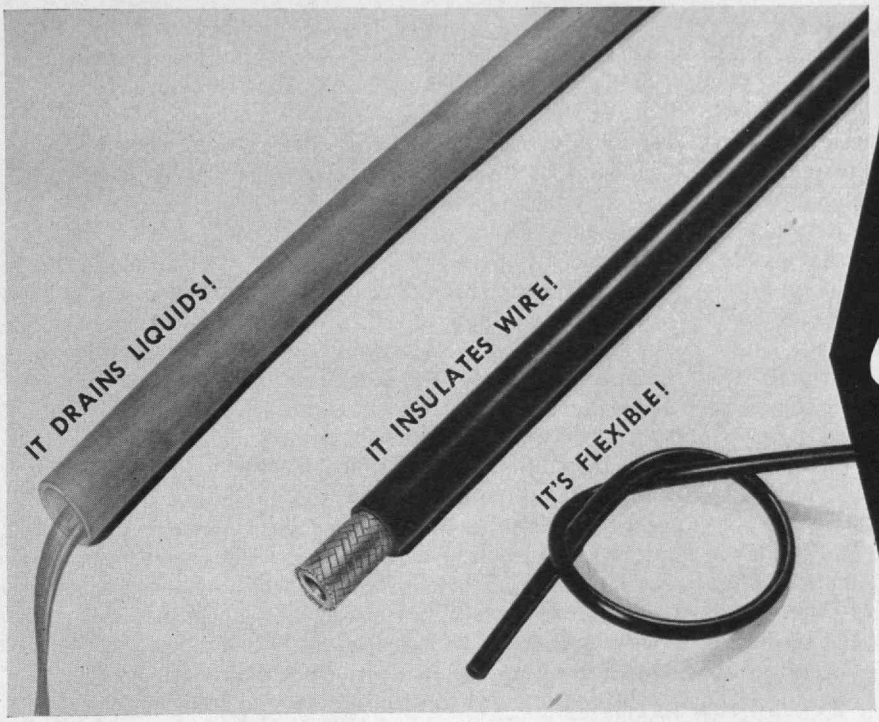
Both Stringfellow and Marriott are known to have been in America after Henson's arrival here. The former came with his son for a short visit in 1849. Marriott left England and settled in San Francisco, also in 1849. He became a successful banker and newspaper owner and later (1869) patented a flying machine of his own. He died in 1884. There is nothing to indicate, however, that Henson was ever in touch with his former colleagues. He may even possibly have remained ignorant of the model flight of 1848. It was little publicized until the appearance of the F. J. Stringfellow pamphlet of 1892.

Several footnotes and penciled comments are found in a copy of John Wise's book, *A System of Aeronautics, Comprehending Its Earliest Investigations, and Modern Practice and Art* (1850), presented to Henson by his friend and fellow inventor, Joseph Yates, probably in 1855 or 1856. Wise, discussing Henson's *Ariel*, says on page 87: ". . . it was seriously contemplated to build one after his model, with which to cross the Atlantic." Somewhat indignantly, Henson appended: "This was mere newspaper talk, I never thought of anything so absurd. I knew that the steam Engine had to be remodelled to make steam navigation practicable and I still farther remodelled steam Boilers and produced the lightest engine ever built which on a small scale was still insufficient the Engine only developed 1/4 the power of the steam altho it was operated with a cut off." On another page, Henson made certain corrections in the stated dimensions of the full-scale aerial steam carriage and added the following information regarding the engine: that it was "twenty H.P. consisting of two Cylinder 7″ diam. 14″ stroke. The pair of Engines and Boiler were actually built by Houchin of the City Road London. Richard Houchin was recommended by John Farey C.E. an eminent London Engineer and authority in Engineering. It was never tested." This is the only indication that construction work on the full-scale project was actually started before the transit company's collapse.

Although Henson spent at least 10 years on the subject, he was not essentially *aeronautically minded*. Considering the state of the art in the middle Nineteenth Century, one has no reason to expect that he would be. He did not have the scientific curiosity nor the educational background of a George Cayley. He was primarily a mechanic — an inventor. All his life he was continually thinking up new ideas in mechanics and in machinery. To him no mechanism was perfect. Each new device that he saw apparently challenged him to improve upon it. He would work intensively on something for a time, then drop it — a new razor, an aeroplane, a breech-loading cannon, a method for waterproofing fabrics, an ice machine, a springboard, or a device for cleaning cisterns. Toward the end of his life he became intensely interested in the mechanics of the universe. He observed, he read, he speculated, and he wrote on astronomical matters.

His only known published work is a treatise on astronomy privately printed in Newark in the spring of 1871. It is short, only 28 pages, but its scope can be gauged from the title: "The Great Facts of Modern Astronomy with an Exposition of What They Teach, Comprising the Formation of the Sun and Stars, the Cause of Rotary Motion, the Formation of the Planets and Their Satellites, Solution of the Law of Distances, Theory of Light, and the Sun Spots." Evidently Henson was not

(*Concluded on page 438*)



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GRANDFATHER OF FLIGHT

(*Concluded from page 436*)

one to cramp his imaginings by limiting his subject. A few copies of this book still exist. There is no evidence that it had a wide circulation. The final paragraph of the preface yields a tenuous clue to the character of the man: "I make no pretentions to be an astronomer, or to enter into the extreme exactness of that exalted science, but the business of my life has made me familiar with mechanical motions; and believing that I have traced the motions of the planets to their source, I have undertaken in my own way, to make it known. If it is truth, as I believe it to be, it will stand; if it can be shown that it is not true, let it fall."

Henson called himself an engineer — "civil," "mechanical," or "consulting," as his situation seemed to warrant. Although he probably lacked a degree, he cannot be criticized for so styling himself. The engineers of the middle 1850's were practical men as well as theorists. They could do things with their hands. Thus, Henson qualifies. By all the standards of the times, he was entitled to write the word "engineer" after his name.

He came by his talents honestly. For at least two generations before him, his people had been mechanically inclined. His grandfather Thomas, "the strongest man in Nottinghamshire," was a cabinetmaker and wheelwright. Born in the town of Bunny, he married Anne Piccard and settled in Ruddington, where his son William was born on August 22, 1786. Young William probably had little formal education, but he was apprenticed at an early age to a "framework knitter" in Nottingham (probably about 1798). He married Martha Charge in 1807. His progress was rapid, for by 1812 (the year William Samuel was born) he was elected a burgess of Nottingham and was already talked of as an "inventive genius." He had survived the Luddite riots of 1811–1812 with some distinction. About 1820, he and his growing family moved to Worcester, where he became a manufacturer of lace, leaving a trail of patents for devices to improve the machinery and processes of manufacture. His first wife died sometime in the early 1830's, and shortly thereafter he married again and moved to Chard. Between 1845 and 1848 he moved to America and settled in Newark, where William Samuel joined him in 1848. According to the Nottingham *Guardian* of November 5, 1879, the senior Henson contrived a considerable improvement in carpet machinery, "of which he was thoroughly robbed by the Yankees . . . and sorely wounded by the gross rascality with which he was treated in America, he left that country. . . ." Subsequently, he lived to an advanced age, inventing things almost to the day of his death, October 17, 1879. He is buried in Nottingham.

Of William Samuel Henson as a person, only the sketchiest accounts remain. His surviving daughter, Mrs. George W. Lipsham, is now too ill to be questioned. The only other living relative who knew him is a grandson, E. T. Henson, who "saw . . . grandfather only once when, as a child of 10 or 11, I visited his home for a week or two. I recall him as a gray-bearded, pleasant enough old gentleman who had a kindly interest in one of his grandsons and was kindly and gracious." (This visit must have occurred shortly before Henson's death.)

Family tradition has it that as an old man, he was inclined to be dictatorial and of strong opinions, especially where politics was concerned. Like many inventors, he was a poor businessman. He had ideas — others profited by them. When he had a little money, it would dribble through his fingers, and he would think up something new to try to recoup his losses.

Henson was certainly not one of the great men of history. He made little lasting contribution to science or to engineering. Unlike the name of Watt or Stephenson or Fulton, Henson's name is not associated with the beginning of a new era. He was one who let his imagination roam in regions that could not be explored and exploited until the more solid workers — the plodders, if you will — had contrived the tools to cut the steps on which to climb. Such will-o'-the-wisps of science serve a useful purpose. They dart hither and yon, enticing others to venture after them. Some of their followers stumble into pitfalls and vanish. Others find solid footing and win to some lasting achievement.

THE DILEMMA OF SYMPATHY

(*Continued from page 428*)

Fatigue of Workers, issued by the National Research Council's committee on work in industry: ". . . the increase in the output rate of the girls in the Relay Assembly Test Room could not be related to any change in their physical conditions of work, whether experimentally induced or not. It could, however, be related to what can only be spoken of as the development of an organized social group in a peculiar and effective relation with its supervisors."

In trying to find out what actually went on in the workers' minds, what they liked or didn't like about the company, why they didn't work with their fullest co-operation, the investigators at the Hawthorne plant interviewed over 21,000 individual employees between 1928 and 1930, and as experience with this program piled up, the interviews took on more and more of a psychoanalytical flavor. Shades of Frederick W. Taylor! Very little attempt was made to steer the conversation into channels with a direct interest to the management, the attitude being that if a worker kept returning to the same theme again and again, that topic revealed important information about him, regardless of its lack of objectivity or direction. Though such an elaborate peering into the worker's mental state is not yet common in industry — it is time consuming, requires a skilled staff, and, if not handled with the greatest discretion, may easily arouse suspicion — surveys of attitudes by means of questionnaires are becoming increasingly common. Just as sociological and psychological techniques are being applied to the human problems of industry, so are the methods of sampling mass opinion which have been developed by students of political questions and business markets. An article on the organizational problems of an instrument manufac-

(*Continued on page 440*)

A

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To Disabled and Incapacitated Ex-Service Men







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THE DILEMMA OF SYMPATHY

(*Continued from page 438*)

turing company recently appeared in the journal *Applied Anthropology*. After all, why are the relationships and frictions of a group of engineers any less a subject for anthropological research than is the social life of a group of Fiji Islanders?

Just a few months ago an Associated Press dispatch told how the Army is using questionnaires to "track down rumors of complaints about various phases of Army life and find out what is wrong, if anything." The questioning is done with ballot-box anonymity, an important condition in making such surveys a success, and 98 per cent of the answers seem to be honest expressions of opinion. Among the more interesting facts revealed by some recent surveys of employee attitudes in industry is that between 20 and 40 per cent of the younger workers feel that they are not getting the advancement they deserve.

Perhaps the most important problem uncovered by these various new approaches to the study of worker fatigue and labor relations is defined by a brilliant phrase from *Fatigue of Workers*. The investigators speak of a "failure of communication" among the various levels of the organization. Particularly in large and elaborate organizations, no adequate channels exist by which the management can be informed by the workers of their fears and aspirations and of the many other considerations which may disturb them. Nor does the management commonly take the trouble to convince the workers that the changes which it is continuously initiating and which often require painful adjustments on the part of the men at the work levels are for their mutual benefit.

To change a man's duties, to move him from one point to another in the plant, to promote or demote him, or to change even the size and construction of his desk is to interfere with the complex, subtle, and hard-to-learn fabric of social relationships, feelings, and loyalties which begins to form whenever a group of people work together for any period of time. To use Roethlisberger's shrewd illustration of how complicated these relationships may be, a person talking with his boss acts differently when the boss's boss is also present. And if he doesn't react to delicate differences in situations, he doesn't get along well with people. Indeed, the man who ignores the entirely unofficial sanctions of the group and who does not automatically examine every change in it with an eye to its possible effects on his standing and prestige is so rare that he is apt to be suspected of having some psychic abnormality. This social fabric rather than the formal organization of industry determines behavior and forms the basis of discipline and co-operation.

But here a dilemma begins to emerge. Since the demands of the formal organization of industry and the quite informal social fabric which also relates the personnel are in conflict at many points, which shall prevail? There is little question that, as the anthropologist Ralph Linton put it: "It is clear that the individual

(*Continued on page 442*)

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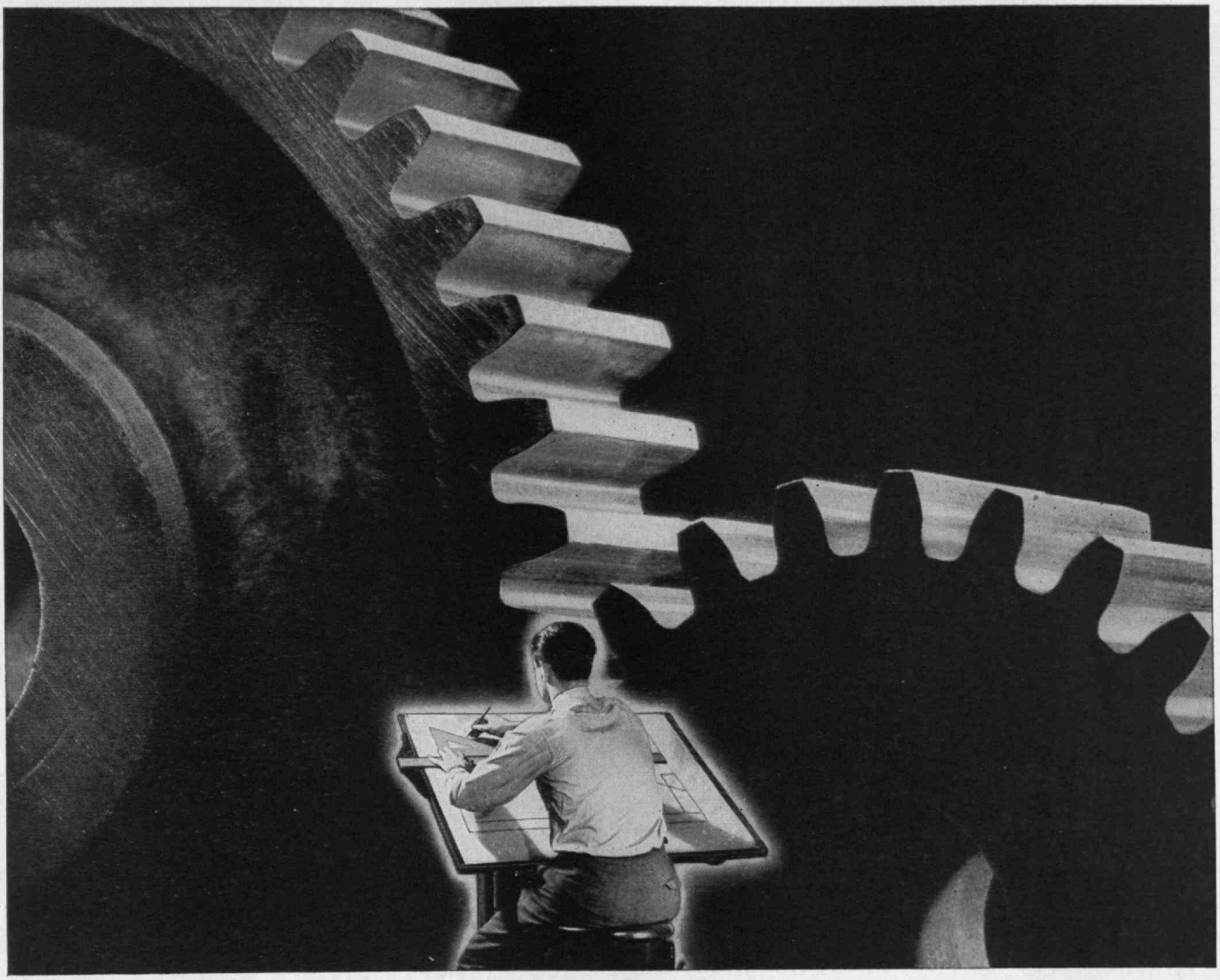
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Winning involves fighting and bonds and blood donations, but Victory will call for new or revamped products and the machines to make them at a cost that will let you face the competition of Peace.... Such machines will take time—months of it—to convert from design or model to the practical production stage.

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THE DILEMMA OF SYMPATHY

(*Continued from page 440*)

has psychological and emotional needs as well as physiological ones and that part of the culture is to provide satisfaction for these. . . ." As far as the individual's physiological needs are concerned, industry to a large extent already recognizes that it must meet them, and progress in that direction has been helped in no small measure by the fact that precautions for the health, safety, and comfort of its personnel almost invariably pay in the long run. But if industry is to make any substantial attempt to establish an ideal environment for social man (in so far as we understand what such an environment includes), management must abandon many of its traditional methods and aims.

While some workers can be found who seem to prefer the conditions of mass production and the production line above all others, the monotony arising from that source is one of the important causes of fatigue and discontent in industry. Should we then discard these techniques? Changes in social patterns must normally take place extremely slowly if painful adjustments are to be minimized. As Elton Mayo points out in his introduction to Roethlisberger's book, "In a simple society the extent of change from year to year, or even from century to century may be relatively small. Traditional methods are therefore brought to a high degree of perfection; almost from birth disciplined collaboration is drilled into the individual." By way of contrast, he cites the fate of the chief operators of the tin-plate mills of western Pennsylvania a generation ago. Highly skilled men, they had considerable prestige in the mills and in their communities. But processes changed; as a result: "In these days the skill they possess has been completely superseded, their social position by consequence abolished." One can list a few revolutions which have also abolished social positions, and wholesale. Would we be better off today had there been no such revolutions? Is there not a moral in the fact that India, symbol of rigid, unchanging social structure, is the largest reservoir of silver in the world? Why? Because its people have deep-seated traditions about keeping their wealth in concentrated, easily portable form — an excellent precaution for those who are frequently exposed to physical insecurity.

As previously mentioned, the ceaseless flow of orders from the management down to the work levels, disrupting habits, changing rates and methods of payment, punishing slackness and inefficiency, all disturb the worker's peace of mind. Even in the Soviet Union, which avows a philosophy of government whereby the proletariat rules, which actually started by giving the workers a large voice in the control of industry, management has gradually re-exerted its authority until today it appears that the Russian worker is under as strict a discipline as exists in any capitalistic country. With few exceptions, each Russian worker or salaried person must have a "labor book" which enables the authorities to check effectively on his movements and rates of payment, while unaccounted-for lateness and absenteeism have long been punishable offenses. An interesting parallel may be found in the tightening up of discipline in the Red army and the increase in the authority of officers which followed the Russo-Finnish War. In Mexico, President Camacho recently had occasion to point out to the Workers Syndicate some of the by-products of Mexico's attempts to free its masses from abuses and exploitation by moving toward a worker's Utopia, free of hard-eyed bosses. In accusing labor of being principally responsible for the chaotic state of the government-owned railroads, he mentioned the workers' "lack of discipline, inexplicable waste of material and useless and unnecessary misuse of materials," and the "impossibility of obtaining efficiency and responsibility from the railroad workers." To crown it all, at least one union in the United States, the giant International Ladies' Garment Workers union, has declared that since inefficient management in its industry has an unfavorable effect on the earnings of workers on piece rates, such inefficiency is therefore a legitimate condition for union action. Furthermore, a detailed clause to that effect has been inserted into an agreement which the dress manufacturers of New York, after some bickering, signed.

As always, the primary burden of making a satisfactory adjustment to his environment must still remain with the individual. Management, like labor, has its crosses to carry, and many a worker would be surprised to learn how much executives must bear and forbear in the ordinary course of their duties. Labor in general, for example, cannot expect supervision so intelligent or so considerate as that experienced by the girls in the relay test room at the Hawthorne plant. There just isn't enough supervision of that caliber to be spread so thick. Labor cannot expect industry to alter its techniques or its methods of administration beyond the point where a net gain to industry, or at least to the community, results, for the primary purpose of industry is to produce efficiently, not to form a pleasant place in which to work. The struggle for existence continues as fiercely as ever it did, except that the contest is now primarily between nation and nation rather than between man and man or man and nature. If monotony, uncertainty, and physical strain are the price of progress for industry, the price must be paid or a far heavier price will some day be exacted in toil and blood. It is our particular era's brand of hard luck, just as glaciers were the cave man's.

Yet much can be done which, far from interfering with the technical functions of industry, might actually make them move more smoothly. Harmony and larger profits would probably result if greater use were made of intelligence, aptitude, and personality tests even in their present state of development, and if more attention were given to individual preferences and ambitions in placing workers, so that cases of poor placement would be rare enough to deserve to be called accidents. Some of the sting of technical change would be removed if industry established large-scale, continuous, and well-planned educational programs not only to train newcomers but also to keep the older workers abreast of their arts. The ability of people to learn as they grow older seems to be quite generally underrated for, according to some investigators, adults — at least

(*Concluded on page 444*)



A Letter from Guadalcanal...

In a recent letter from a lad at Guadalcanal to his former employer was voiced the greatest challenge of our time.

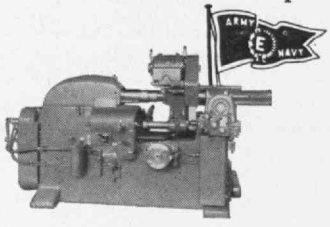
"What," he said, "am I, and all these fellows with me, going to do when this thing is over?" Is peace to bring with it the deadly spiral: men laid off and demobilized, hence less purchasing power, hence more plants closed down, hence more men laid off, hence — ?

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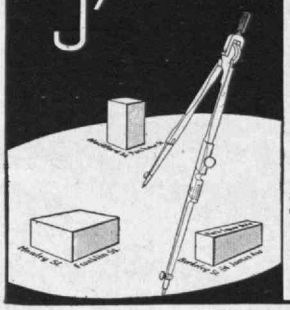
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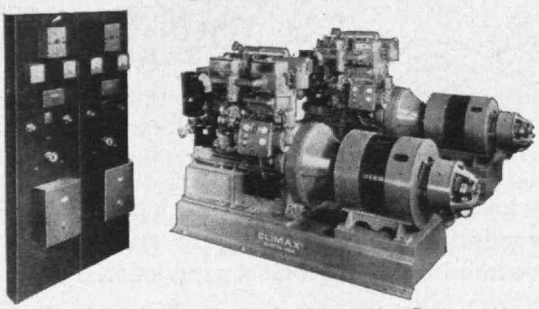
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THE DILEMMA OF SYMPATHY

(*Concluded from page 442*)

until the age of 45 — will learn about as readily as when they were adolescents, particularly if the material is in line with previously established interests. In the conversion of American industry to war, whole factories of employees have been trained, and successfully, to wholly new trades. And, obviously, there is no excuse for such lack of personal consideration on the part of a management that a majority of its workers will declare, as they did in one survey, that the owners "do not treat the workingman like a human being."

As Uncle Dudley said some time ago in the Boston *Globe:* "To release every form of talent is one main function of human society." History has a few cases of nations and periods in which men worked together with trust and enthusiasm. We can have no nobler aim than to create such a state in our own time.

DR. GATLING AND HIS GUN

(*Continued from page 426*)

The Indianapolis inventor also managed to get the sympathetic ear of the Navy. That department had just registered one conspicuous success through making experiments, even against the resistance of an old-fogy bureaucracy. Secretary Gideon Welles had as little patience for traditionalists as for fools. Gustavus Vasa Fox, an able career naval officer, had become "Father Gideon's" Assistant Secretary, supplying much of the technical and professional imagination and policy for a Navy direction that got amazing results. Over the old-timers' protests, Welles and Fox had both pushed to get John Ericsson a contract to build the *Monitor;* the contest with the *Merrimac* in Hampton Roads had shown the great value of the "cheesebox on a raft." Now the Navy ordered a few of Gatling's new quick-firers, on the chance that they might be good to repel boarders or perhaps to cover landing parties from cutters. The result was that Gatling's trip to the embattled capital on the Potomac was not a complete water haul.

Interestingly enough, the first actual employment of the Gatling gun was not in troop action but in the New York draft riots of July, 1863. These had been preceded by ominous threats of hoodlum elements against the chief pro-Union papers, Horace Greeley's *Tribune* and

(*Continued on page 446*)

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DR. GATLING AND HIS GUN

(*Continued from page 444*)

Henry J. Raymond's *Times*. Raymond, later to be congressman as well as newspaper proprietor, ordered that the quarters of the *Times* be prepared for efficient defense against any mob that might come against it. A tradition of the paper, as cited by Elmer Davis in his history of the *Times*, was that Raymond's close friendship for President Lincoln led him to apply to the latter for some Gatling guns and that Lincoln obligingly had three of them dispatched to Manhattan. Be this as it may, the guns were procured. One was mounted on the roof, so that its field of fire could sweep the street in either direction; the other two were set up inside the business office; and the entire staff was issued rifles. Any rioters attempting entry into the plant would have had a hot reception. On July 14, 1863, a mob did break into the *Tribune* offices and caused considerable damage. But the *Times* building was not invaded, and the Gatling guns were not put to the practical test.

An interesting side light on this emplacement of the doctor's invention to combat fifth columnists is that from late 1862 onward, Gatling himself was under suspicion as a subversionist. What motives originally led him to join the Knights of the Golden Circle, a sophomoric secret order which swept the Border States in 1861–1862, have never been clearly disclosed. Doubtless his North Carolinian birth and boyhood had much to do with it, as did the further fact that Indiana democracy was a hotbed of the new order which masked treason in ritualistic mummery. To these must have been added Dr. Gatling's resentment over the cavalier treatment he received from the Ordnance Department.

Whatever the cause, the fact was clear that the inventor drew closer and closer to the Confederates. Records of the judge advocate general's office and the letter books of the Secretary of War, now in the National Archives at Washington, give some clues to the inventor's course. When the Knights of the Golden Circle was exposed and its ringleaders were arrested early in 1862, a second organization — the Order of American Knights — was soon established. Gatling became a leader in O.A.K. councils in Indianapolis, as spies within the lodge soon told the Federal authorities.

This new order proved about as inept as had the Knights of the Golden Circle. Late in 1863, its national leaders in Missouri were arrested, and its effectiveness was virtually ended. The chief Copperheads, however, soon rigged up another society for treason, this one called "Sons of Liberty." Again Dr. Gatling took an active part in its Indiana council.

The Federal authorities smuggled their own spies inside the Kentucky and the Indiana state councils of the new order, and they reported some quite alarming activities. Felix G. Stidger, the most successful of them, soon informed Colonel Edward C. Carrington, the Army's provost marshal for Indiana, concerning details of Dr. Gatling's participation. Stidger reported one meeting in Louisville at which the Indianapolis inventor had proposed a sort of Greek-fire filling for bombs either for Sons of Liberty troops or for their Confederate allies.

(*Continued on page 448*)



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DR. GATLING AND HIS GUN

(*Continued from page 446*)

There was talk, too, that the designs of the Gatling gun might be turned over to the Confederate Army, inasmuch as the United States Army had rejected it.

These Stidger reports, and others, led Carrington to try to lay the basis for haling Gatling before a military commission to put him on trial as a dangerous conspirator against the United States. The particular charge, probably, would have been that he had sold his machine gun to the United States Army but now had betrayed it to the enemy.

Carrington's efforts to establish any basis for this were frustrated by the War Department in Washington. On July 13, 1864 — almost a year to a day after the New York riots in which three of the guns had been mounted to protect the *Times* office — Colonel James A. Hardie, inspector general in the Office of the Secretary of War, answered Carrington's inquiry: "I am directed to inform you that the Ordnance Department have never purchased any of the 'Gatling guns' and that only very few are in use in our Navy. The gun does not enjoy a high reputation."

Despite this categorical denial that the Federal Army bought any of the new guns, Dr. Gatling's own elaborate diaries and reminiscences contend that they did play their part in the campaign outcome — in particular, in one small sector in the Petersburg campaign in March, 1865. The records do not reveal the way the gun got to the Army. But there is report to the effect that, when used, "its devastating fire struck consternation" to the enemy directly in its path.

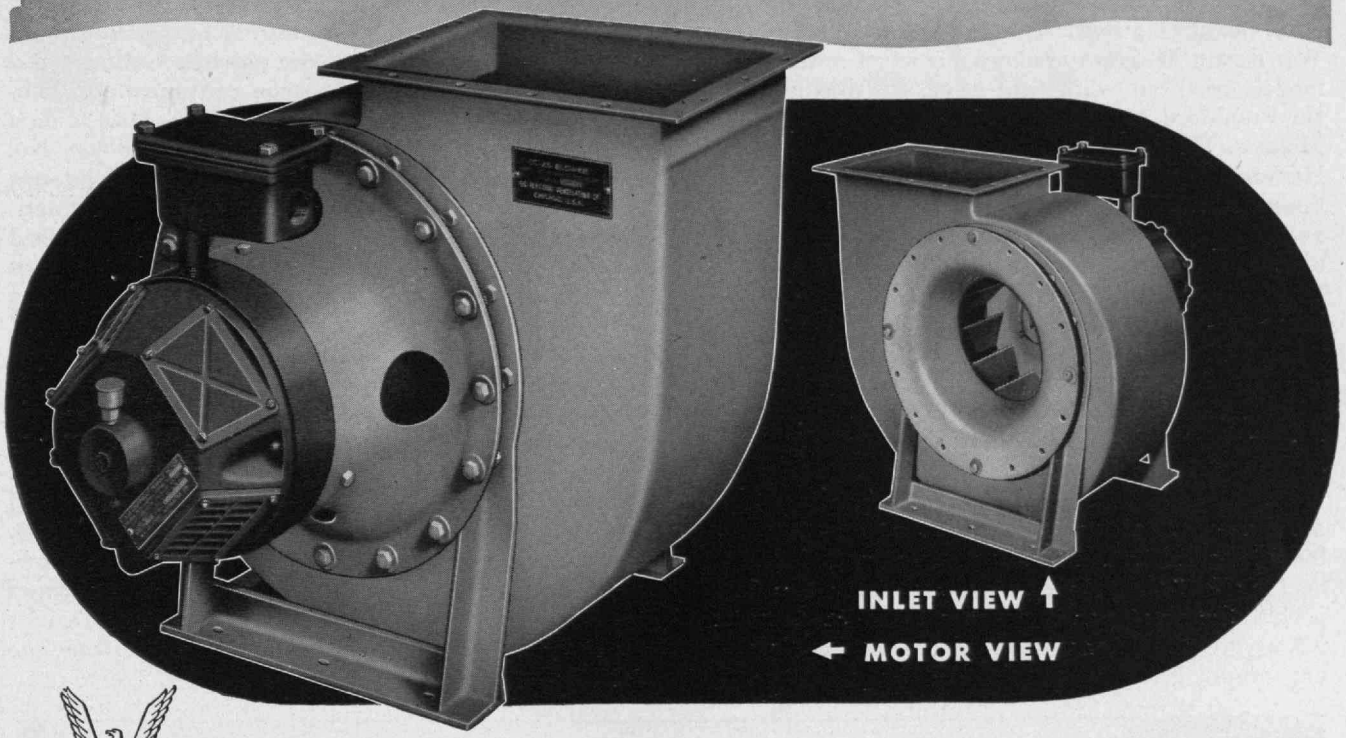
Apparently Gatling had given up immediate hope of crashing the gate of the Ordnance Department. Late in 1862, after General Ripley had pushed him aside, he turned to foreign fields and in particular to Emperor Napoleon III of France. In 1863, Gatling crossed the Atlantic and demonstrated his gun to the French experts, who eagerly borrowed its fundamental ideas. The Montigny mitrailleuse, which the French brought out shortly thereafter, was chiefly an adaptation of the Gatling gun. When the latest model of the gun was shown at the Paris exhibition in 1867, the Empress Eugénie herself once turned the crank to run the gun. Gatling termed Louis Napoleon "a shrewd little chap" and was pleased at the attention paid him and his gun.

There is an ironic postscript to the United States Army Ordnance Department's record. Gatling kept working on his gun, and on May 9, 1865, the Patent Office issued him a second patent, No. 47,631. He termed this one "Battery Gun," and described it thus: "This gun belongs to the class of many-barrelled field pieces and consists of a series of barrels mounted on a central shaft or spindle and revolved by suitable wheel gear and hand crank. The charges or cartridges are automatically fed into the chambers of the barrels successively, and the several hammers are so arranged in connection with the barrels, that the whole operation of loading, closing the breech, discharging and expelling the empty cartridge cases, is conducted while the barrels are kept in a continuous revolving movement."

(*Concluded on page 450*)

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DR. GATLING AND HIS GUN

(*Concluded from page 448*)

About this time the Ordnance Department began to take a new interest in the gun. The Civil War was over, Lee had surrendered — and there was a new chief of ordnance. General Ripley had been replaced by Brigadier General Alexander B. Dyer, a younger and abler man. Gatling's gun was now given a trial. Secretary of War Edwin M. Stanton and his chief of ordnance had models tried out, with field firings at Washington, at the Frankford Arsenal in Philadelphia, and at Fortress Monroe. These trials showed that the gun would work. Its rate of fire had been built up to about 1,200 rounds a minute. In 1866 the Army ordered 100 Gatling guns, and thereafter it was standard equipment for the Army until later inventions replaced it.

By that time, however, Dr. Gatling had found more fertile fields for sale than the military services of his native country. He licensed the British ordnance firm of Sir W. G. Armstrong and Company to manufacture his invention, and for decades the company's great munitions plant at Newcastle upon Tyne turned out these weapons for shipment to Russia and China, Argentina and Chile. Gatling visited St. Petersburg, where Alexander II, Autocrat of All the Russias, entertained him at the Winter Palace and personally conducted the doctor about the palace to display to him the crown jewels, the great paintings, and the other treasures. No wonder the visitor described the Czar as "a plain, unassuming gentleman."

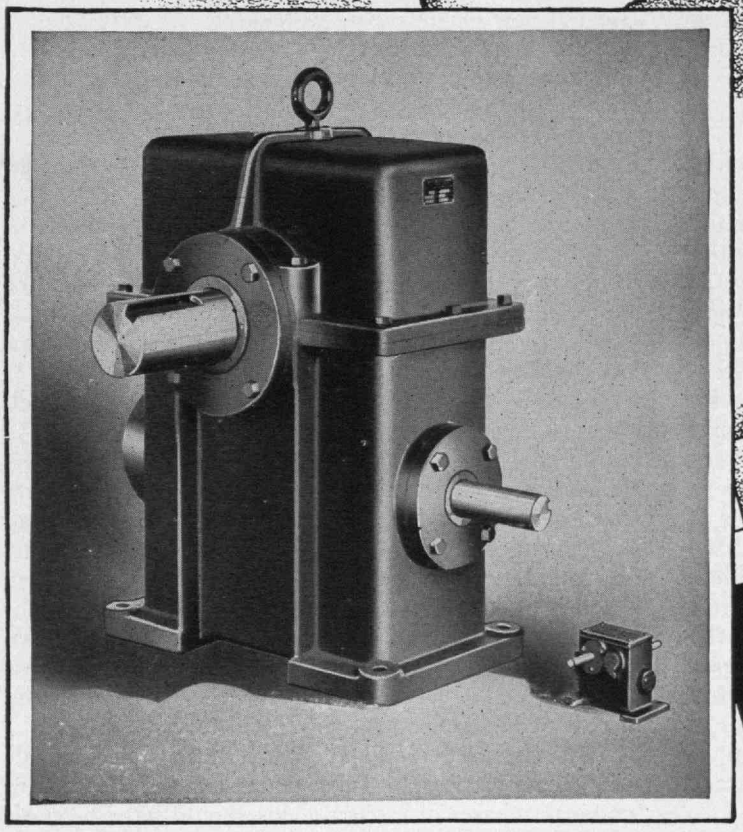
Gatling's gun made him immensely rich — at least, as wealth was measured in America in those days. In 1870 he sold the American rights to Colt's armory at Hartford, Conn., which manufactured the guns for American sale and competed with Armstrong's for the markets of the world. The foreign military men realized that each army had to buy this modern arm to counterbalance the danger of use of it by the potential enemy. That same year the inventor moved to Hartford.

Despite his sale of the basic patents, Gatling's zeal for improvements on his weapon continued. On February 28, 1871, he was issued Patent No. 112,138 on a new model, and on April 9, 1872, a further one, No. 125,563. For the next two decades his inventive interest was focused on other types of devices, principally agricultural machinery. But in the early Nineties he returned to the machine-gun development competition, perhaps because of the Hotchkiss and other upstarts. During 1893 he was issued three machine-gun patents, the last one on September 12, No. 504,831.

Thereupon he reverted once more to his boyhood zeal for new farm machinery. When he was 80 years old, he established a company in St. Louis to make a steam plow and other farm machinery. For six years he was president of the American Association of Inventors and Manufacturers. He died in 1903 at the ripe age of 84. His "humanitarian invention" lived after him, however, and its basic principle is employed by many armies in today's total war. The first syllable of his name is preserved in gangster argot, for "gat" came from the Gatling gun.



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TECHNICAL FORCE: ECONOMIC STRESS

(*Continued from page 424*)

functions of the price system is to determine the quantity of the different kinds of goods which will be produced and consumed throughout the economy. This function cannot be performed efficiently if various prices are deliberately held above the level of cost.

Briefly stated, the economic effect of a technological innovation on the domestic economy is to alter the optimum allocation of workers, materials, plants, and other productive agencies. If we are to insure that these various resources make their maximum contribution to the general well-being, we must see that they are redistributed according to the requirements of each new technological situation. We must have our labor and our capital goods in the places where they are most needed as indicated by cost and price relationships. If we plan to retain the private-enterprise method of controlling economic activities, we must live up to the rules of the game and follow the guides of the price system. No attempt will be made here to discuss ways and means of enhancing the adaptability of the economy. The first prerequisite of improvement is to recognize the essential nature of the problem. When in the aftermath of war the rate of technological change is accelerated, this recognition may be of great assistance in enabling us to arrive at a correct solution.

SINCE commodities move across national frontiers in accordance with cost and price differentials, conditions affecting costs and prices determine the economic position of a nation in the world economy. Natural and human resources are, of course, basic factors in international trade. Yet the effectiveness with which the labor of a nation is utilized in converting materials into finished goods depends in large measure upon technical knowledge, skill, and equipment. And technology has another and even greater significance: By determining what materials shall be used and what kinds of labor shall be employed, technical conditions have an important influence in deciding which regions will be selected to specialize in the various branches of production. Countries with a relative abundance of the appropriate resources are chosen; those with relatively little are rejected. Thus the international exchange of goods and hence the position of each nation in the economic system of the world are to a large degree decided in our scientific and engineering laboratories, though of course one should not underrate the importance of politics, education, law, and the other components of the institutional framework in which economic and technological factors operate.

Likewise, it may be said that changes in technology deflect the channels of world trade and alter international relationships. The development of the sailing ship and of new instruments for navigation transformed the ocean from a barrier into a communicating way and laid the foundation for the commercial predominance of the nations of western Europe. When steam was applied to transportation, bringing the farmers of our Middle West into competition with grain producers on the other side of the Atlantic, a serious depression in European agriculture followed. Examples might be multiplied from the history of our own times. The discovery of new techniques, such as the atmospheric fixation of nitrogen and the process of selective flotation, the invention of substitutes for such things as camphor and indigo, have had important international repercussions, as is well known. We are now speculating as to the ultimate effect upon the foreign trade of Scandinavia and Canada of the devising of more efficient means for utilizing southern pine in the manufacture of paper, and we are wondering what is going to happen to the postwar exports of Japan, Java, and the Malay States as the result of the development of synthetic substitutes for silk and rubber.

There is no doubt that the coming flood of technological innovation will create serious economic problems for the postwar world. Suppose, for instance, that Japan should lose a substantial part of its foreign market for silk and therefore lose also the power to buy foreign goods, which those exports furnished to the Japanese people. The international position of Japan would be different from what it was before the war. The nation would be compelled to find new exports that would take the place of silk, or to curtail its imports. Either of these readjustments would affect other countries: If new exports were developed, the industries of other nations would meet increased competition from Japanese producers; if imports were reduced, the industries of other countries would be deprived of an important foreign outlet. The loss of purchasing power resulting from the invention of substitutes for silk might be made up by Japanese borrowings from abroad, but this would be only a makeshift, a temporary means of postponing the inevitable. Eventually foreign trade would have to be reorganized — not only the trade of Japan but also that of the United States, Great Britain, China, India, and other countries with which Japan has developed commercial relations.

Let us not deceive ourselves. World trade, in such circumstances, must be reorganized, and the process is bound to be harmful to certain vested interests. The choice before us is whether to promote readjustments that carry with them an increase of trade or those that result in reducing the range and volume of it. Specialization involves exchange of goods. If we choose a policy of expansion, we shall foster national specialization and therefore stimulate world production: if we choose a policy of restriction, we shall divert resources to uneconomic uses and fall short of achieving the largest possible output of goods and services.

After the first World War, the nations decided almost unanimously in favor of restriction. Countries whose purchases of foreign goods should have been allowed to increase so as to prevent a contraction of trade, imposed barriers of various kinds — tariffs, quota limitations, currency depreciation, and exchange controls. These barriers forced other nations — those whose international position required increased sales of goods abroad — to adopt the alternative of curtailing imports. Thus one set of restrictions called forth others;

(*Concluded on page 454*)

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TECHNICAL FORCE: ECONOMIC STRESS

(*Concluded from page 452*)

and as the restrictions multiplied, the disequilibriums increased and spread. Between 1929 and 1932, the physical quantity of world trade decreased by more than 25 per cent, a decline which was accompanied by a collapse of prices. The gold value of international trade by 1932 had fallen 60 per cent and its sterling value 46 per cent, as compared with what they had been in 1929.

From the end of World War I to 1929, the trade of the world was supported largely by credit transactions. The gaps in the international accounts of various nations — gaps which had been created by wartime technological and other changes — were filled by the movement of capital. Such movements perform a very useful function. The commercial adjustments necessary to equalize payments cannot be made at a moment's notice. A nation cannot make great changes in its foreign trade without undergoing slow and painful internal industrial transformations. And it may be said that if disorder is to be avoided after the present war, provision must be made for international borrowing and lending on a large scale. Yet transactions of this sort, however necessary they may be to cushion the shock of change and to ease the transition, cannot be regarded as offering a long-term solution of the problem. This statement is supported by our own experience: During the 1920's, when foreigners urgently needed American dollars to meet their payments to us, we advanced them the money through the purchase of foreign bonds. This policy would perhaps have been justified if at the same time we had prepared the way for the eventual substitution of imports for loans. We made no such preparation. On the contrary, we raised the barriers against foreign goods. Our loan policy, as might be expected, broke down. The more bonds we bought, the greater the interest obligations of the debtor countries became; as these obligations piled up, our international financial position became more and more unbalanced. When in 1929 we finally curtailed our foreign loans, the debtor countries were compelled to adopt drastic import restrictions.

This experience is not mentioned to suggest that the United States was the sole offender. But it does show what the result is likely to be at the end of World War II if each nation undertakes to regulate its foreign trade without regard to the broader implications of its policy. There is today much sentiment in favor of international co-operation. We need to realize, however, that co-operation is a practical necessity. Technological as well as other types of innovation, by changing the factors which determine the localization of production, will call for some redistribution of industry among the nations of the world. To soften the impact of these changes and to facilitate the necessary long-term readjustments, hard economic and political thinking will be required, as well as a willingness to co-operate in working out concerted policies. The way of isolation leads to international economic chaos.

To say that the domestic economy should be freed from the restraints of monopoly and that the world economy should be freed from the restrictions of autarchy is not to advocate a domestic policy of *laissez faire* or an international policy of unmitigated free trade. In the domestic economy, intervention is necessary not only to curb monopolists but also to promote the adaptations required by changed technological conditions. A good example of the latter appears in the report Sir William Beveridge recently submitted to the British Parliament, in which he proposes, as one of several measures for social security, that training benefits be made available to assist in re-educating those who are thrown out of work on account of technological innovations.

Constructive intervention will be necessary also in the world economy. No nation can afford to abandon its producers to the operation of crude international competition: its industries will need guidance and help during the painful transitions resulting from technical discoveries. Most important of all, a social framework must be constructed which is favorable to the extension of international division of labor. Perhaps no argument for self-sufficiency is stronger than that of military necessity: the nation must be freed from economic dependence in time of war. The United States, for example, acting on this principle, may be extremely reluctant to curtail its synthetic rubber industry after the war even if sound economic reasons are adduced for doing so. Unfortunately this policy of national self-sufficiency is itself a potent cause of international dissension, for if the different nations proceed to block their neighbors from important materials and markets, the grievances of the have-nots and of the overpopulated nations become causes of bitterness and aggression. Thus the fear of war breeds war — an intolerable chain of events involving endless struggle and destruction.

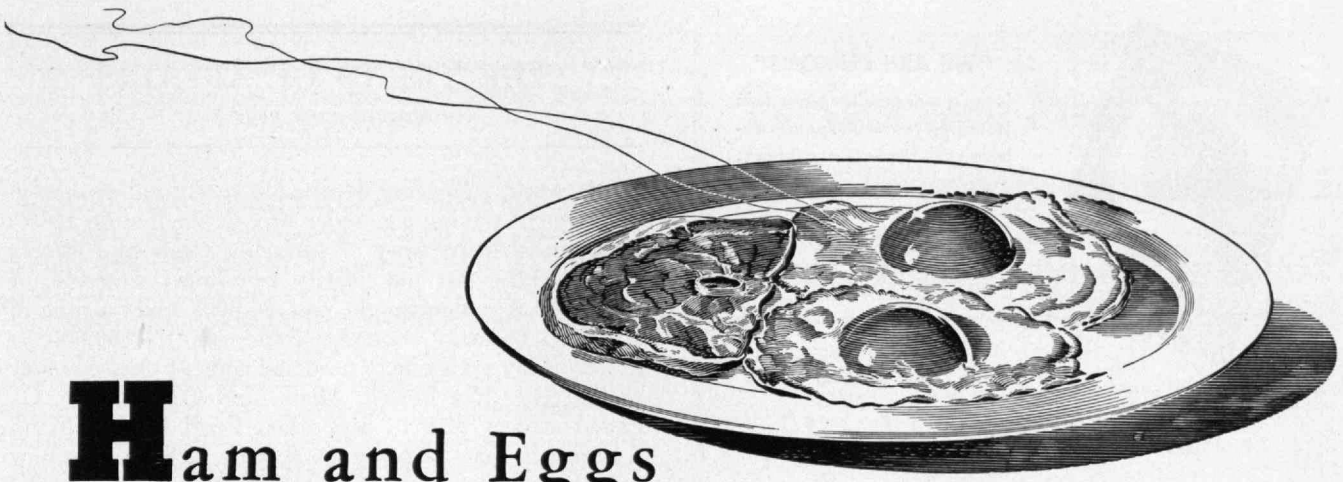
THE TREND OF AFFAIRS

(*Continued from page 418*)

advantage in wartime. Sawdust concrete is being tested in several American universities. Concrete is bound to play an important role in low-cost housing, and architects have advanced novel plans calling for use of it. One interesting approach is that of Tom Hibben at the experimental housing project at Arlington, Va. Applying new technique to an ancient method, he has built livable three-room bungalows out of plain mud with a little cement or emulsified asphalt to bind it. The earth houses may be built of earth-cement blocks, or molds for entire walls may be made and the mixture rammed into them. After treatment with cement paint, the houses are trim, attractive, and economical to heat. Experiments at the University of Illinois show that almost any kind of dirt can be used; the secret is to analyze the soil and write the recipe accordingly.

But the really big success of ordinary dirt stabilized with cement is in roads, streets, and airfields. To highway and military engineers "soil cement" has become a

(*Continued on page 456*)



Ham and Eggs
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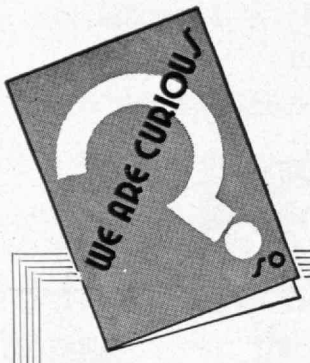
Simplicity is a fundamental in the design of Busch-Sulzer Diesels, whether for marine or stationary power plants. A convincing example is the trunk piston. It was a startling innovation when introduced into the larger two-cycle engines a dozen years ago, but positive performance has proved the soundness of the step. In a Busch-Sulzer trunk piston, mechanical injection Diesel, you can count upon finding all of the elements that make for a long and lusty life.

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THE TREND OF AFFAIRS

(*Continued from page 454*)

magic word, signifying invaluable speed and economy. Soil-cement paving got under way in the middle 1930's as an inexpensive way of surfacing roads and streets where traffic did not justify reinforced concrete. A mile of this paving might cost $4,000, while a mile of standard highway concrete would run to $30,000 or more. Many states have used soil cement on secondary roads; cities like Lowell, Mass., and Columbia, S. C., paved streets with it, and when Pearl Harbor found America in need of some 4,000 more airfields, the new process went to town in double time, for both continental and offshore bases.

As a means for creating short-order airports on almost any soil, this method has no equal. The process is simple: After the ground is broken by scarifiers and pulverized with disk harrows, dry cement is spread and harrowed in thoroughly. Water — carefully measured — is sprinkled over the mixture. After more harrowing to dampen the mixture evenly, the field is rolled to a firm smooth surface, which is good, engineers say, for more than ten years' service.

In one rush job, men and machines set to work on desert land and after 18 working hours, had paved more than seven acres. One entire airport of 750,000 square yards was completed in 42 working days. And there are other savings. Since surface soil forms about 90 per cent of the mixture, trucks, tires, gasoline, and shipping space are conserved. Army engineers are being trained to use soil cement for emergency construction and for repair of bombed airports. By keeping on hand a supply of dry soil premixed with cement, airfield maintenance men can now repair shell craters almost before the drone of enemy bombers has died away.

Breaking away from the traditional gray, concrete is now being made in every color of the rainbow. Concrete camouflage dyes are made to conceal war plants from the air. Prepared in powder form, dissolved, and added to the mix, the colors simulate surrounding foliage or earth. Other dyes are being used for concrete floors and offer attractive possibilities for houses. Bomber plants have used white concrete to pave their floors, with the result that light softly reflected on the undersides of plane wings gives better illumination for workers. Black concrete, made by addition of carbon black or iron oxide, has been used in a number of highways to cut the

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glare of night driving; in Texas, permanent strips of black concrete now take the place of the painted white center stripe which had to be renewed every six months.

An M for a T

MORE than five million tons of metal will be made available for war service during this year by the substitution of wood in the manufacture of products previously made of metal, according to estimates based on reports of the War Production Board, the Army, the Navy, the Maritime Commission, the Forest Service, the Census Bureau, and industrial concerns. The amount of metal "saved" as a result of this conversion is of the same order as the figure for 1942. But in that year the utilization of wood instead of metal was primarily in the field of construction; in the present year the virtual completion of major construction programs has seen the metal-saving resort to wood shift into the field of production, where wood is taking the place of metal in a host of civilian consumer goods, the manufacture of many of which in metal has been stopped.

What the shift from metal to wood means statistically can be summarized in the fact that during the chiefly constructional phase of the development, the use of timber-connector construction is reckoned as having saved 400,000 tons of structural steel in roof trusses alone. Statisticians of the National Lumber Manufacturers Association have set up another yardstick in the finding that on the average one ton of steel can be saved by the use of 1,000 board feet of lumber. With cast iron, the saving can be greater; with sheet metal, it is smaller.

To Industrial Plant Owners

On page 439 of this issue of The Technology Review is an advertisement, paid for by us, which we commend to your attention.

We are running this ad because we believe in it; because we think it will help to meet a situation that is developing faster than you may think.

> **Brigadier General Alden H. Waitt, speaking recently at the presentation of the Army-Navy E award to the Standard Oil Development Company and its Esso laboratories, stated: "The casualty lists are mounting. By spring these lists will appall us and we shall begin to realize how serious the war has become. Then the entire nation will be ready to go all out for victory and right then we shall start to win the war."**

Therefore we pass the idea along to you and invite you to use it also . . . in the public print . . . for the public good.

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MAIL RETURNS

(*Concluded from page 410*)

In September, 1905, Manly had severed his connection with the Smithsonian and was in New York, engaged in the establishment of the Manly Drive Company. During those days, George D. McDonald was his shop foreman and principal assistant. Regarding the Dayton visit McDonald wrote to Basil Manly on October 27, 1940: "As for Mr. Manly's being in Dayton, Ohio on the 23rd of September 1905, it seems to me that it was almost impossible for him to have been there and for me not to have known anything about it as I was always demonstrating the machine while Mr. Manly did all the talking. If Mr. Manly was in Dayton, I am positive that he would have made himself known to the Wright brothers as he always said the Wright brothers were doing noble work." Incidentally, Mr. McDonald also stated positively that Charles Manly was wearing a large mustache at that time and for many years later.

Further, the records of the Smithsonian have been checked to see if any report was ever made to Langley or if any expense vouchers covering the trip were ever turned in. Manly's own letter files have also been investigated. None gives any intimation of the alleged trip. The matter of expense is pertinent because the correspondence shows that Charles Manly was then extremely hard pressed for funds and was borrowing money from a cousin, Professor William G. Manly, to meet the pay rolls and organization expenses of the Manly Drive Company. It seems quite improbable that he would have spent money at that time for a trip to Dayton simply to satisfy his curiosity — and there is no other reason in evidence to account for the trip.

Finally, the point has been made that the Wrights could not understand how Manly knew so much about their activities by November of 1905 unless he had actually been to Dayton. They were unable to explain otherwise the fact that accurate reports of their flying had been given to Alexander Graham Bell in Washington.

There is a simple explanation. Carl Dienstbach, a well-known aeronautical writer of the time, was in correspondence with the Wrights almost from the Kitty Hawk days. From 1903 through 1905 he wrote a number of articles for American as well as for German and other foreign papers, describing accurately and in detail the progress of the flying at Dayton. (A long list of references can be found in Paul Brockett's Bibliography of Aeronautics for 1910.) During the fall of 1905, Dienstbach wrote to Albert Zahm at Washington, giving him the latest information. During that period, Alexander Graham Bell held weekly soirees in his Washington home. There scientific matters of all kinds were discussed, none more actively than the newest of them all — aeronautics. To this group Zahm relayed Dienstbach's information. Later, Manly met with Zahm and Bell in New York and undoubtedly picked up from them the information that he included in his address to the Aero Club.

Altogether, I find no evidence whatever that the Dayton visitor was Charles Manly, nor can I find any logical reason why he might have gone to Dayton incognito as described. I can only repeat my original conclusion that "whoever the visitor . . . it was not Charles Manly."

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TECHNOLOGY MEN IN ACTION

THE ALUMNI FUND—ITS PROBLEMS AND GROWTH

THE FIRST MONTH

SPRING came late this year. On April 1, when the annual Alumni Fund entered its fourth year, buds should have been bursting, birds singing in the trees, but in Cambridge there was a snow flurry accompanied by icy blasts. There was nothing cold, however, about the response of Technology's Alumni. Although winter lingered all through that month, by the 30th of April, 1,865 men had already contributed $33,387.26 — an average of $17.90. Although the number of contributors was somewhat less than last year at this same time, the amount of their average contribution increased appreciably.

As May finally broke winter's hold, Alumni everywhere received the annual report of last year's record-breaking activity. Their response to the request which it contained for funds to smooth Technology's postwar path was immediate and enthusiastic. Some remembered the situation which arose after the last war, when it was found necessary to raise several million dollars so that the Institute might successfully weather the storms which it then encountered. Our Alumni realized that the Fund's goal of a $100,000 annual gift to M.I.T. represented the income on $2,500,000, and they knew that assurance of its availability would make possible the charting of a future course, unhampered by many of the financial uncertainties of the past.

Already contributions were being received from England, Africa, and the south Pacific. Our Alumni — even on the battlefronts of the world — have not forgotten. They realize what Technology has meant to them; they realize, possibly more strongly than most, what it will mean to those who follow. And they want to play a continuing, active part. That feeling is common to Technology's Alumni everywhere. We may look forward to a year in which our Alumni Fund will continue to express that feeling in increasing degree.

TECHNOLOGY CLUB STANDING

This year for the first time, several Technology Clubs have expressed a desire to enter into the Alumni Fund activity to a limited degree. Although no personal solicitation will be made either at club meetings or elsewhere by club members, the officers of these clubs believed that the members would be interested in seeing how their clubs compared with others. During the Gym Fund of several years ago, they had an opportunity to do just this. Now, in our annual fund-raising activity, the same opportunity has been made available.

By the end of April, active membership lists had been received from seven clubs, although it is anticipated that more will follow. The records of these clubs vary widely. Led by the Philadelphia Club, which initiated the idea last year, three of the seven show results distinctly ahead of those for the alumni body as a whole. In the early days of the year's activity, such comparisons are far from conclusive. They do, however, give an indication of what may be expected, or of what needs to be done. As of April 30, the record stands as follows:

	*Per cent of Contributors**	*Average Contribution*
Philadelphia	20	$24.60
Western Pennsylvania	17	16.90
Northern New Jersey	12	12.30
Buffalo	7	30.00
Central Pennsylvania	6	13.00
Cincinnati	6	8.33
Dallas	5	10.00
Alumni Body as a whole	6	17.90

* *Based on number of active members.*

TECHNOLOGY MEN IN ACTION

M.I.T. MEN AT WAR

Over 4,300 Institute Alumni are serving in the active military or naval services of the United Nations according to Alumni Association records as of May 8. Brigadier General Wilbur E. Dunkelberg '22 is a new addition to Alumni in high command.

Additions and corrections to the listings which have previously appeared, beginning with the issue of November, 1942, will continue to be published in future issues of The Review. As a matter of convenience, promotions and corrections in the rank previously given are grouped under a single heading, "Changes in Rank." The Review Editors are greatly indebted to the many Alumni and other readers who are continuing to co-operate so helpfully in reporting inevitable errors of omission and commission which they note in these listings.

NEW DECORATIONS

1924 Doolittle, James H., *Maj. Gen.*, U.S.A.; Silver Star for gallantry in action — North Africa.

1924 Henry, Stephen G., *Maj. Gen.*, U.S.A.; Distinguished Service Medal for establishing the Armored Force School, Fort Knox.

NEW LISTINGS

U.S.A.

1890 Curtis, William G., *Lt. Col.*
1911 Baxter, Lewis L., *Lt. Col.*
1913 Achard, Francis H., *Capt.*
1915 Worthington, Harold, *1st Lt.*
1916 Newton, Burkett D., *Capt.*
Rowlett, Richard S., *Maj.*
1918 Leonard, Julian T., *Capt.*
1919 Miller, W. Barrington, *Capt.*
1920 Dopmeyer, Arthur J., *Lt. Col.*
Gelders, Joseph S., *S/Sgt.*
1921 Delany, Edwin F., *1st Lt.*
Green, Roy, *Maj.*
Griffith, Llewellyn B., *Capt.*
Kerrigan, Ambrose L., *Maj.*
1922 Bliss, Lawrence P., *1st Lt.*
Hall, Fred C., *Capt.*
Miller, Charles B., Jr., *Maj.*
Starbuck, Charles, Jr., *1st Lt.*
Taylor, E. Elvidge, *Lt. Col.*
Whitman, Sidney E., *S/Sgt.*
1923 Beattie, Malcolm B., *Capt.*
Coupland, Robert S., Jr., *Capt.*
Hurley, George H., *Capt.*
Zane, John H., *1st Lt.*
1924 Bailey, Theron P., *Capt.*
Williams, Arthur B., *Maj.*
1925 Ballentine, Ralph O., *2d Lt.*
Barron, Clarence B., *Lt. Col.*
Delugach, Gilbert L., *1st Lt.*
Myrick, G. Colburn, *Capt.*
Noell, William C., *Capt.*
Stovin, Philip B., *Maj.*
Trask, Henry C., *Lt. Col.*
1926 Bittner, Guy C., *Maj.*
Hamilton, Ward L., *Maj.*
Powers, David B., *Capt.*
1927 Fletcher, Edward F., *Capt.*
1928 Goble, Richard B., *Pvt.*
Gorfinkle, William I., *Lt.*
Robinson, S. Crawford, *Capt.*
Taylor, Frank A., *Capt.*
1929 Osgood, Dexter T., *Capt.*
Ryder, Myron W., *Maj.*
1930 Ackiss, Arnold S., *Capt.*
Bowley, Raymond J., *Capt.*
Dryer, James C., Jr., *Maj.*
Feingold, Eugene B., *Pvt.*
Huckle, Myron S., *Maj.*
Kingsley, Edwin M., *Capt.*
1931 Bahr, John W., *2d Lt.*
Chapman, George A., *1st Lt.*
King, John H., *2d Lt.*
Poor, Raymond S., *Capt.*
Walden, Walford, *Capt.*
1932 Badgett, Edward D., *Capt.*
Brown, John J., *Capt.*
Duffy, William H., *Pvt.*
Hoover, John W., *1st Lt.*
1933 Bruce, Alfred P.
Case, Charles V., Jr., *Lt.*
Frazier, George F., *1st Lt.*
Jackson, Goldthwait, *1st Lt.*
Kalman, Jack R., *Capt.*
Korb, Herbert E., *2d Lt.*
Mankowich, Ivan, *Capt.*
McConnell, Miller E., *Capt.*
Shaw, Edwin T., *Corp.*
Spilhaus, Athelstan F., *Capt.*
Towel, Harold P., *Pvt.*
1934 DeVausney, William H., *2d Lt.*
Ellis, Charles E., *T/Sgt.*
Koller, George F., *Capt.*
1935 Dello Russo, Pergentino, *Pvt.*
Hall, S. Richard, *1st Lt.*
Hoffman, Edward, *Lt.*
McMath, Hugh L., *1st Lt.*
Mills, Charles W., Jr., *Capt.*
Parker, Henry P., *2d Lt.*
Shurcliff, John P., *Pvt.*
Slade, Charles E., *2d Lt.*
Travers, Frederick W., *Capt.*
Trescher, William, *Lt.*
Waferling, John J., *1st Lt.*
Wilson, Cornelius J., *Capt.*
1936 Alderhold, George W., *Capt.*
Morgan, Paul S., *Lt.*
Neily, Joseph W., *2d Lt.*
Sawyer, Robert E., *A/C*
Thomas, Ariel A., *1st Lt.*
Varner, David E., *1st Lt.*
1937 Garber, Alvin J., *2d Lt.*
Loomis, Austin C., *A/C*
Wynot, Albert S., *Capt.*
1938 Golden, Harold L., *Pvt.*
Griffeth, Robert A., *1st Lt.*
Jackson, James M., *2d Lt.*
Rosenberg, Jack, *2d Lt.*
Rosenthal, Harold, *Pvt.*
Rote, John G., Jr., *A/C*
Stein, Francis S., *1st Lt.*
Therkelsen, Ernest B., *Lt.*
1939 Brown, Edgar D., *Capt.*
Courland, Raphael H., *Pvt.*
Kittredge, Harry C., Jr., *2d Lt.*
Martin, Richard D., *2d Lt.*
Morin, Edward G., *A/C*
Pearl, Eliot N., *1st Lt.*
Root, Kenneth W., Jr., *Capt.*
Rudnick, Burton D., *Cadet*
Scheidt, Frederick E., *Pvt.*
1940 d'Hemecourt, George A., Jr., *A/C*
Goddard, Charles T., *2d Lt.*
Hurley, Henry W., *Lt. Col.*
Long, Moses C., *2d Lt.*
Meyer, Herman L., *Capt.*
Park, Peter G., *1st Lt.*
Stout, Jack L., *T. 4/g*
Wheeler, Byron W., Jr., *Capt.*
1941 Ball, Frank J., *1st Lt.*
Barber, Robert L., *1st Lt.*
Coombs, Robert D., 3d, *Capt.*
Shead, William B., *Lt.*
Shumaker, Robert F., *Pvt.*
1942 Argetsinger, Lyle M., *1st Lt.*
Badger, Theodore J., *A/C*
Bloom, Robert I., *Lt.*
Boyer, Robert P., *Lt.*
Budge, William W., *2d Lt.*
Clear, Albert F., Jr., *1st Lt.*
Dunne, Peter J., *A/C*
Foster, Arthur J., *2d Lt.*
Given, Robert H., *1st Lt.*
Hamlin, William G., *Pvt.*
Innis, John A., *1st Lt.*
Jacobs, Harold G., *2d Lt.*
Krey, John W., *2d Lt.*
Littwitz, James K., *1st Lt.*
Lorsch, Helmut G., *Pvt.*
Lumbert, Allyn R., *1st Lt.*
Marriner, Ernest C., Jr., *Pvt.*
Olson, George E., *2d Lt.*
Prohaska, Charles A., *Lt.*
Stetson, Harold B., *2d Lt.*
Webb, Arthur C.
Wise, Edgar W., *Lt.*

U.S.N.

1914 Barratt, Roswell F., *Lt. Comdr.*
1917 Childs, Paul D., *Lt. Comdr.*
Chisholm, Stanley L., *Lt. Comdr.*
Peterson, John B., *Lt. Comdr.*
1920 Doyle, Jesse I., *Lt. Comdr.*
Hennessy, Daniel J., *Lt.*
Nebolsine, Eugene A., *Lt.*
1921 Hill, Francis T., *Lt.*
1922 Moynihan, John C.
1923 Baumeister, Werner W., *Lt.*
Knight, Elliot P., *Lt. Comdr.*
Travers, Frank J., *Lt.*
1924 Ames, Azel, Jr., *Lt. Comdr.*
Fisher, Alvan, *Comdr.*
Hart, Robert W., *Lt.*
Potvin, Edgar H., *C.P.O.*
1925 Alderman, Clifford L., *Lt. Comdr.*
1926 Avery, Richard W., *Lt.*
Billings, Lyman, *Lt.*
Greenwood, W. Russell, *Lt. (j.g.)*
Hogg, F. Trevor, *Lt. Comdr.*
1927 Ward, Parker J., *Lt. (j.g.)*
1928 Huffman, Kenneth C., *Lt. Comdr.*
Jessup, Harlan R., *Lt. Comdr.*
Logan, Albert V., *Lt.*
Titherington, Richard H., Jr., *Lt. (j.g.)*
1929 Harrigan, Edward R., *Lt.*
Sword, Stanford H., *Lt.*
1930 Barnes, Richard T., *Lt. (j.g.)*
Egleson, James D., *Lt. (j.g.)*
Forsberg, Mary E., *Lt. (j.g.)*
Hamilton, Charles H., *Lt. (j.g.)*
Hughes, Charles E., *Lt. (j.g.)*
1931 Chambers, Fred, *Lt. (j.g.)*
Elwell, Allan D., *Lt. (j.g.)*
Hodges, Winthrop D., *Lt.*
Morrill, Theodore C., *Lt. (j.g.)*
Roberts, W. James, *Lt.*
Steinbach, Charles W., *Lt. (j.g.)*
1932 Anderson, Robert R., *T. 2/c*
Harris, Everett W., *Lt.*
Hawksley, Ray, *Lt. (j.g.)*
Morgan, Donald K., *Lt. (j.g.)*
Paris, Nathan, *Lt. (j.g.)*
Reid, William H., *Lt. (j.g.)*
Wells, Stanley E., *C.M. 1/c*
1933 Bassett, John F., *C/Sp. (T)*
Kreuzkamp, August J., Jr., *Lt. (j.g.)*
1934 Gow, Robert B., *Ens.*
Pattee, Frederick H., *Lt. (j.g.)*
Walker, Philip B., *Lt. (j.g.)*
1935 Birchall, Louis F., *Ens.*
Close, Winston A., *Lt. (j.g.)*
Matthews, Frank B., *Ens.*
1936 Lowe, Brenton W., *Lt. (j.g.)*
McMillan, Brockway, *Ens.*
Waxman, M. Murray, *Lt. (j.g.)*
1937 Hanlon, Daniel J., Jr., *Ens.*
1938 Clough, F. Tenney, *Ens.*
Hawkes, Albert J., *Mo.M.M. 2/c*
Steele, Thomas L., *Lt. (j.g.)*
Waldinger, Robert H., *Lt.*
1939 Cooke, Frederick A. F., *Lt.*
Howard, John H., *Lt. (j.g.)*
Timbie, Donald N., *Ens.*
1940 Conaly, Edward P., *S/K 3/c*
DeAngelis, Michael N., *Ens.*
Luce, Stanley F., *Lt.*
Mann, Frederick M., Jr., *Ens.*
Martinez, Rafael J., *Ens.*
O'Donnell, Eugene E., *B.M. 2/c*
1941 Moffet, Clifford E., *Ens.*
Stern, John A., *Lt.*
Walsh, John W., *R.T. 2/c*
1942 Baghdoyan, Leon A., *Ens.*
Batson, Robert A., *Ens.*
Chappelle, Robert N., *Ens.*
Flynn, William J., *Lt. (j.g.)*
Lynch, William M., *Ens.*
Markell, John, Jr., *A/C*
Richardson, T. W. Gilmer, *Ens.*
Stempf, Charles R., *Ens.*
Warren, Edward C., *Ens.*

U.S.C.G.

1929 Vaughn, Stanley W., *Lt.*

U.S.M.C.

1934 Smith, Robert L., *Corp.*
1937 Gibbs, Henry T., *1st Lt.*
Rose, Sherman A., *S/Sgt.*
1938 Bachmann, Louis, Jr., *2d Lt.*
Crocker, Frederic P., *2d Lt.*
1939 Clark, Sterling M.
Hutchins, Samuel E., *Lt.*
1940 Bosher, Benjamin A., *2d Lt.*
1941 Ferguson, James H., 3d, *2d Lt.*

Canadian Army

1933 Winters, Robert H., *Major*

CHANGES IN RANK

U.S.A.

1919 Morrison, Robert F., *Maj.* to *Lt. Col.*
1922 Dunkelberg, Wilbur E., *Capt.* to *Brig. Gen.*
1923 Ruddell, James C., *Lt. Col.* to *Col.*
1924 Hennessy, John F., *Maj.* to *Lt. Col.*
Quarles, William W., *Maj.* to *Lt. Col.*
1925 DeKay, John W., Jr., *Pvt.* to *Sgt.*
1927 Cowen, Edward G., *Lt. Col.* to *Col.*
1928 Kelsey, Benjamin S., *Lt. Col.* to *Col.*
Knight, Ernest H., *Lt.* to *Capt.*
1929 Fitch, Kenneth R., *Pvt.* to *Sgt.*
1930 Leedy, Myron, *Capt.* to *Col.*
1931 Baxter, Robert H., *Capt.* to *Maj.*
Strong, John E., *Maj.* to *Lt. Col.*
1932 Franklin, Edward C., *Maj.* to *Lt. Col.*
1933 Miller, Lewis N., *Lt.* to *Capt.*
Ryder, Lincoln W., *Lt.* to *Capt.*
1934 Brown, Charles T., *Corp.* to *T/Sgt.*
Cotter, Edward J., *Maj.* to *Col.*
Hayden, Thomas M., *Lt.* to *Capt.*
1935 Colby, Joseph M., *Capt.* to *Lt. Col.*
Parker, James D., *Capt.* to *Maj.*
1936 Carota, Arthur A., *Lt.* to *Capt.*
Charnley, Thomas L., *Corp.* to *Sgt.*
1937 Chase, Charles C., *Capt.* to *Maj.*
Dreselly, Raymond A., *Lt.* to *Capt.*
Eaton, Robert E., *Lt.* to *Col.*
McCormack, James, Jr., *Maj.* to *Lt. Col.*
Moore, Ernest, *Lt.* to *Col.*
Neagle, Francis E., Jr., *Capt.* to *Maj.*
Tank, Charles F., *Capt.* to *Lt. Col.*
1938 Gillon, Paul N., *Lt.* to *Lt. Col.*
Maguire, James, *Lt.* to *Maj.*
1939 Davies, William E., *Lt.* to *Capt.*
Epifano, C. Philip, *Lt.* to *Capt.*
1940 Dickson, Richard P., *Lt.* to *Capt.*
Ross, Donald W., *Lt.* to *Capt.*
Russell, Sam C., *Capt.* to *Lt. Col.*
Wheeler, Richard H., Jr., *Lt.* to *Capt.*
1941 Lawrence, Eugene F., *Lt.* to *Capt.*
1942 Seaton, William B., *Pvt.* to *A/C*
Telling, Edward C., *Lt.* to *Capt.*

CASUALTIES

1926 Fine, F. Gurney, *Capt.*, U.S.A., died in service; Calif., May 4.

ALUMNI AND OFFICERS IN THE NEWS

Frontline News

¶ About John W. Beretta '23, in the San Antonio *Light*. Lieutenant Colonel Beretta was given credit by Major General Gerald C. Brant for some of the outstanding feats accomplished in constructing the new air and naval base in Newfoundland. General Brant, who had been commander of the base, said that on two occasions Colonel Beretta "planned and completed two difficult projects while engineering groups were arguing it couldn't be done."

¶ About Henry C. Trask '25 in the *Stars and Stripes*. Lieutenant Colonel Trask is in charge of an American Army school in England. His students are taught to find, identify, and render harmless the "booby traps" used by the enemy. As a result of his research and organization work, "every American soldier going into action will have enough knowledge to avoid and take the sting out of these nasty little scorpions of modern war."

¶ About Walter R. Daley '35, in a special radio story sent from London to the Chicago *News*. Lieutenant Daley is a gun-crew commander on the convoy supply line to Murmansk. He and his crew have been shot at by dive bombers, torpedo planes, submarines, and fighters. "They have seen the worst and they have given an account of themselves that makes another glorious chapter in this story of trying to get supplies through to Russia, in face of Germany's incredibly concentrated U-boat and torpedo-plane campaign."

¶ About Thomas T. Crowley '42, in the Boston *Globe*. Lieutenant Crowley is leader of a mine-detecting group which dug up Axis mines along the Feriana-Gafsa Road in Africa so that the Army could pass by in safety.

Address

¶ By Harold V. O. Coes '06, who spoke on "Education for Management," at a dinner meeting of the war production conference held in Schenectady by manufacturers of northeastern New York. Mr. Coes is president of the American Society of Mechanical Engineers. James L. Walsh '07 spoke on logistics, the science of combining mass production and economy, at the same conference. Mr. Walsh is director of the Army Ordnance Association.

¶ By Albert J. Browning '22, who spoke on "War Department Procurement Policies and Methods," at a joint meeting of the Kiwanis Club and the Chamber of Commerce of Salt Lake City. Colonel Browning is director of the purchases division of the Army Service Forces.

¶ By Alberto F. Thompson, Jr., staff, who spoke about new explosives for bombs and shells, at a General Electric science forum in Schenectady.

Honor on the Home Front

¶ To Robert H. Leach '00, who received the Franklin Institute's Wetherill Medal for his achievements in metallurgical development.

¶ To Linwood I. Noyes '17, who is the new president of the American Newspaper Publishers Association.

¶ To Theodore P. Wright '18, who was made a key figure in the country's aircraft production. As director of the Aircraft Resources Control Office, Mr. Wright has been given authority by the Aircraft Production Board over the industry's man power, materials, and machine tools.

¶ To J. Frederic Walker '25, who was elected president of the western New York section of the American Chemical Society.

¶ To James A. Merrill '30, who was awarded the Citation of Individual Production Merit by President Roosevelt. Mr. Merrill co-ordinated the work of a group of chemists and perfected a bullet-puncture-sealing fuel tank, which is now being used by our armed forces.

Add Literati

¶ Charles G. Abbot '94, "Solar Radiation as a Power Source," *Military Engineer*, February.

¶ Ridsdale Ellis '09, *Patent Assignments and Licenses*, second edition, Baker, Voorhis.

¶ John T. Norton '18 and Daniel Rosenthal, staff, "An Investigation of the Behavior of Residual Stresses Under External Load and Their Effect on Safety," *Welding Journal*, research supplement, February.

¶ Carole A. Clarke '21, "The Selenium Rectifier and How It Operates," *Electronic Industries*, April.

¶ Alfred Griffin Ashcroft '23, "Research Manpower in High Schools," *Textile Research*, January.

DEATHS

* *Mentioned in class notes.*

¶ Edgar B. Thompson '82, May, 1941.
¶ George F. Lull '84, April 8.
¶ Winthrop Packard '85, April 1.*
¶ Giles Taintor '87, January 27.*
¶ Fred A. Thomas '87, May 2, 1942.*
¶ William R. Thomas '87, January 8.*
¶ Charles F. Koch '90, February 17.*
¶ Bertram H. Mann '90, January 1.*
¶ Elisha B. Bird '91, April 9.*
¶ William R. Kales '92, December 3.*
¶ F. Patterson Smith '92, April 2.*
¶ Winthrop L. Tidd '92, April 10.*
¶ Harley W. Morrill '93, April 2.*
¶ William H. Bovey '94, April 26.
¶ Mabel H. Chapin '94, November 3.
¶ Isaac B. Hazelton '94, January 27.*
¶ George A. Nichols '95, February 26.*
¶ William R. Hedge '96, April 19.*
¶ Thomas C. Atwood '97, February 2.*
¶ Harry A. Curtis '98, January 25.*
¶ Charles H. Pease '98, March 31.*
¶ Edward W. Roaf '98, February 1.
¶ Benjamin F. W. Russell '98, February 11.*
¶ Sheldon K. Baker '03, July 12.*
¶ James M. Gammons '03, November 2.*
¶ Robert J. Lyons '06, January 13.*
¶ Michael C. O'Neill, Jr., '12, April 12.
¶ Stanley M. Burroughs '11, March 25.*
¶ Roland B. Wells '11, March 11.*
¶ Otto W. Fick '14, August 2.*
¶ David Cleage '17, August 31.
¶ Alden M. Hammond '22, April 11.*
¶ Henry J. Horn, Jr., '22, April 9.*
¶ Francis D. McGinnis '23, December 17.
¶ Parker Morell '28, March 17.*
¶ Harry E. Hubbard '34, October 16.*
¶ Charles F. Kelley, Jr., '42, March 9.*

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

Atlanta Alumni Association of the M.I.T.

The Association held its annual meeting and informal ladies' night on Friday, March 19, at the Double V Chicken House in downtown Atlanta. The affair was well attended, and all present had a most enjoyable evening. The following officers were elected for the coming year: Clifford S. Read '18, President, and Lawrie H. Turner '99, Secretary.

Charles A. Smith '99 acted as toastmaster, and each member of the Association gave a most interesting talk on local subjects. Especially entertaining was an informal talk by Commander William F. Arnold '25 of the United States Naval Air Station in Atlanta.

The following attended the meeting: Charles A. Smith '99 and Miss Mabel Loeb; Lawrie H. Turner '99 and Mrs. Turner; William J. Sayward '01 and Mrs. Sayward; Clifford S. Read '18 and Mrs. Read; William F. Arnold '25 and Mrs. Arnold; Roger W. Allen '27 and Mrs. Allen; Leon B. Locklin '28 and Mrs. Locklin; Albert deRoode '35 and Mrs. deRoode; Robert D. Ballenger '39 and Mrs. Ballenger; and A. Jenkins.

The Association now has an active membership of 44 members. Our ranks have been badly decimated because many of our men are now serving in the Army or Navy or have been transferred to other cities. — LAWRIE H. TURNER '99, *Secretary*, 625 Sherwood Road, Northeast, Atlanta, Ga.

Technology Club of Rochester

The members of the Club have been extremely busy on the production front, so the activities of the Club have been reduced to a minimum. On February 24, however, we had the pleasure of hearing George R. Harrison, Dean of Science at the Institute. In a speech alive with current interest and full of genial humor, Dean Harrison talked to us about the Institute and its part in the war. Although the meeting was held at a time when the Office of Price Administration's ban on pleasure driving was in effect and many of the members had to come by bus, an enjoyable time was had by all.

The executive committee of the Club has directed the Treasurer to withdraw money from the fund reserved for contingencies to purchase war bonds. We pass this idea along to the other clubs who may be as lucky as we were to have in the treasury money which could be used for this purpose. — JAMES S. BRUCE '39, *Secretary*, Building 57, Kodak Park, Rochester, N.Y.

Washington Society of the M.I.T.

The Society held its March meeting on the 25th at Barker Hall, Y.W.C.A. Louis Simon '91 introduced our speaker, Major General Ulysses S. Grant, 3d, as a man of long experience in various tours of duty in Washington as director of public buildings and parks, executive officer of the Arlington Memorial Bridge Commission, and executive officer of the National Capital Park and Planning Commission. General Grant reminded us that Washington is unique as a planned city, with a plan revised and kept up to date. He traced its history from the time of L'Enfant, whose original plan was considered too grandiose. Even in Civil War days, it was not uncommon to trip over pigs in downtown Washington. Another thing unique in Washington history is that there has never been any scandal under its commission form of government.

The population of Washington has increased 42 per cent since 1940. The National Capital Park and Planning Commission finds that all government agencies are in a terrible rush to accomplish their own particular plans, but General Grant has experienced very good co-operation in getting them to conform to the general plan for the city. He gave the Society a preview of a number of projects pending and planned for immediately after the war, including the prevention of further congestion of government buildings by the development east of the Capitol of a mall similar to the existing mall, the development of recreational facilities, and the building of a circular boundary parkway system 43 miles long to eliminate traffic congestion and provide park land. All of the old fort sites have been acquired for this purpose.

Major Merton L. Emerson '04, our President, announced plans for the annual ladies' night. The usual large attendance prevented a few of our members from joining us at dinner. — M. WALDO KEYES '28, *Executive Secretary*, 6514 Brennon Lane, Chevy Chase, Md. WILLIAM K. MACMAHON, *Review Secretary*, Rosslyn Gas Company, 3240 Wilson Boulevard, Arlington, Va.

CLASS NOTES

1885

Once more Father Time has visited '85. On April 1 in Canton, Mass., he removed Winthrop Packard from our midst. Packard was born in Boston on March 7, 1862. Practically all his early pursuits were along literary lines. In 1899 he joined the Cronin exploration expedition to Alaska as correspondent for the Boston *Transcript*, the New York *Post*, and the St. Paul *Dispatch*. Later he became a special writer for the *Transcript*. One can well imagine how much he would have liked to visit Alaska during recent years.

Packard served in the United States Navy in the Spanish-American War and at one time was in the Massachusetts State Guard. He established and financed the Moose Hill Bird Sanctuary in Sharon; he was founder and editor of the *Bulletin* of the Massachusetts Audubon Society; and he was secretary of that society for many years. He established "Everything for Wild Birds," a national service in bird study and protection, and he was author of many books, many of which deal with woodland paths and trails in Florida and the White Mountains.

At the last class luncheon, Winthrop, genial as ever, recounted his amusing experience with an old Ford, which "took the bit in its teeth," bumped into this and that, and finally, much to his amusement, condescended to stop against the house and under a piazza. — ARTHUR K. HUNT, *Secretary*, 145 Longwood Avenue, Brookline, Mass.

1886

The following reminiscences of student days from — can it be the style-o-graphic pen of our classmate, James C. Duff? — have been forwarded to the Secretary by William L. Keplinger '24 of the publicity committee of the Technology Club of New York: "The old chemical laboratory was on the top floor of the Walker Building on Boylston Street, adjacent to the old Rogers Building. The supervision was by certain instructors who although they were at that time regarded by us as martinets, later proved to be regular fellows.

"At one time, we embryo chemists and mining engineers were suspended for an indefinite period by these instructors because of our failure to keep the usual order they required and certainly desired. In the laboratory from time to time there would be an unaccountable explosion of a glass bomb, made from an enlarged bulb on one end of a small piece of glass tubing, partly filled with water and sealed at the small end by fusing the glass. When this was placed under the asbestos covering of the iron heating plate, the loud explosion startled everybody except the perpetrators. No evidence, of course, remained. The instructors sat in an adjacent office, the windows of which formed part of the fumigating hood used for removing obnoxious vapors. Through the glass, the instructors had an unobstructed view of the whole laboratory. Every morning this cloudy glass was cleaned, and every morning occasions arose which necessitated the use of the hood for burning off some volatile chlorides. This, of course, immedi-

1886 Continued

ately clouded the windows most effectually, and thereafter there was no view of the laboratory.

"Such incidents as these finally gave occasion for our suspension. Having this unexpected spare time on our hands, we immediately organized two baseball teams, the miners and the chemists, to play match games on the near-by professional baseball grounds generously donated for these games. The official blackboards in the lobby now bore notice of the time of the baseball games. These games were played for two days, when again the official blackboards gave notice to report to the instructors in the laboratory. After the usual professorial talks, we were again reinstated. History relateth not what the baseball scores were, but rumor states that they were in astronomical figures." — ARTHUR G. ROBBINS, *Secretary*, 12 Grove Street, Winchester, Mass.

1887

At the time of the death of our lamented Class President, Giles Taintor, on January 27, it was possible to secure only a brief account of his career, but later the sketch herewith appended was formulated. Taintor was born on January 22, 1866, in Keene, N.H., the son of Frank L. and Charlotte Wilson Taintor. He received his early education in the Keene public schools. Giles was not only "big brother" to his sister, Eleanor, and brother, Charles Wilson, but also a helpful assistant to his parents. In 1883, he entered Technology and very early began to make friends with his new associates. Giles took an interest in class affairs and in college life which tends to create and build up class spirit.

After receiving his S.B. in Electrical Engineering, he spent a year with the Electric Accumulator Company in New York City. He became interested in the telephone business in 1888, and became manager of the Keene telephone exchange and later assistant manager of the Worcester telephone exchange. In 1891, Giles was electrical engineer with the New England Company, with headquarters at 125 Milk Street, Boston, and soon was superintendent of the right-of-way department. He later took up the study of law, acting as counsel with the company until 1907, when he opened an office at 53 State Street, where he established himself as an attorney, counselor at law, and trustee. In 1931 he moved his office to his home at 120 Brattle Street and later to 51 Highland Street, Cambridge. His later activities were in the real-estate field and consisted principally in the construction of medium-sized, two-family apartment houses.

All through his life, Giles regarded the welfare of his family as his greatest concern. He said, probably more than once, that he had received the greatest satisfaction, and considered it a highly honorable achievement, in being able to give aid and comfort in the support of three generations of his family. His ideals were in accordance with good old New England traditions and customs. He was most devoted to his classmates and to the Class, serving as its president from 1911 to the time of his death. For a number of years, he had been the representative of the Class on the Alumni Council.

On October 10, 1894, he married Charlotte Morton of Springfield, Mass. He is survived by his wife; a son, Charles W. Taintor, 2d; a daughter, Mrs. Elizabeth T. Shepard; and four grandchildren.

Theodore C. Thomas, of Bethlehem, Pa., has sent your Secretary the following sketch of the life and career of his father, our esteemed classmate Fred A. Thomas: "Dad was visiting a nephew, Philip E. Thomas, in Woonsocket at the time of his death on May 2, 1942. He was born in Woonsocket on May 16, 1864, and was a son of Edwin R. and Ann Cook Thomas and a descendant of Francis Cook, who came to America on the *Mayflower* in 1620.

"After leaving Technology, Dad made foundry and machine business his lifework. Starting out with the F. A. Thomas Machine Company in Woonsocket in 1888, he moved his plant to Pawtucket in 1900, where it was known as the H. F. Jenks Company, Inc. He was active up to a short time before his death. As an inventor, he held patents on several types of mill machinery and drinking fountains for people and horses. His main hobby was his work shop, and for recreation he turned to golf and bowling, and many trophies testify to his skill. He was a member of the Masons, the Pawtucket Business Men's Club, and the Pawtucket Golf Club. During the first World War, he served on a selective service board. He married the late Bertha Sharpe in 1888. Besides myself, he is survived by two daughters: Ann E., of Point Pleasant, N.J.; and Rachael J., a resident of Brussels, Belgium."

The Secretary regrets to announce the death of the last Thomas of the Class. William R. Thomas died at his home in Pittsfield, Mass., on January 8. — NATHANIEL T. VERY, *Secretary*, 15 Dearborn Street, Salem, Mass.

1888

The regular five-year anniversary meeting of the Class, for both graduates and three-month infants, comes on June 7. Fifty-five years have passed since the Class of '88 stepped out of swaddling clothes into the hard cold world. In one case at least there has been little change since then, for over one of the doors of the private office of our President, Ned Webster, your Assistant Secretary noticed the other day the original signboard of the Stone and Webster organization, formed in 1889, the year after graduation. The sign reads:

MASSACHUSETTS
ELECTRICAL ENGINEERING CO.
LABORATORY,
SECOND FLOOR
STONE & WEBSTER, — MANAGERS — | — OFFICE, — 4 P. O. SQUARE.

Our meeting, as you doubtless have already heard from our Secretary, will be held at the world-famed Country Club in Brookline. There will be golf, tennis, bowling on the green, and wide open spaces, as well as a private room in the clubhouse for everyone. And Brookline is not in the no-license column! The time of our reunion is 11 A.M., with lunch at 12:30 and dinner at 6:30. In the evening an especially worth-while session has been arranged.

Ned wanted to have the Class come to his home in Chestnut Hill for dinner, but rationing would have necessitated a diet of crackers and milk, which is not up to Ned's usual style. So instead we arranged to meet at The Country Club.

If anyone who ever attended Technology as a member of the Class of '88 has not received a notice, telephone the Assistant Secretary at Kenmore 2500. In any case, consider this a final reminder. — BERTRAND R. T. COLLINS, *Secretary*, Chebeague Island, Maine. SANFORD E. THOMPSON, *Assistant Secretary*, The Thompson and Lichtner Company, Inc., 620 Newbury Street, Boston, Mass.

1890

Bertram H. Mann, retired consulting signal engineer of the Missouri Pacific Railway, passed away on January 1. Mrs. Mann has sent the following letter which Bert had written just a few days before in reply to the request of the Secretary for some information about his experiences: "It was very kind of you to ask me something about myself. I have been mostly 'pioneering,' often on the plains of the West or on the frontier of the Cumberland Mountains of Tennessee.

"After graduation, I went to Pittsburgh to the Union Switch and Signal Company for nine months and then to the mountains of Tennessee and Kentucky, presumably for two years, but instead I stayed seven. Automatic block signals were installed on single tracks for the first time, and the process had few friends. After seven years, I moved. This time I worked on the building, operation, and maintenance of the interlocking plant in the Boston South Station in 1897. Two years of 'advanced civilization' with one thousand trains a day, mostly forenoon and afternoon, and I was on the move again, back to pioneering of single-track automatic block signaling on the Chicago and Alton Railroad. Pioneering among 'men and manners' was the same on the prairie as in the mountains. 'Winning the way' took four years. My last move was more 'pioneering' on the same single-track signaling. It was a long stay — 1903 and on. Single-track protection became a matter of course. Some good jobs were made for present-day maintenance men. The power of the Keokuk Dam took the place of the gravity cell on the rails. High-voltage power lines took out the 'frivolity' of the relay contacts. Signaling had arrived. In 1920–1924, it seemed to me railroads were 'overtracked' for the amount of train movement, and that one track properly used would be enough for all but the busiest traffic lines. The man-

1890 Continued

agement approved an installation of 'signal control of superiority' in train movement on single track in connection with the government's demand for automatic application of the brakes. In 1924 this work was born and the president of the General Railway Signal Company was kind enough to say that his first such job on the New York Central Railroad could not have been without our precedent. . . ."

The *Missouri Pacific Lines Magazine* says: "Mr. Mann was generally recognized as the father of centralized traffic control. He planned and installed the world's first chain of remotely-controlled power switches operated in synchronism with automatic block signals — giving double track capacity to single track — and an innovation which almost immediately claimed the attention of railroad men throughout the country. Mr. Mann gave illustrated lectures on the new system before numerous engineering and technical groups."

Bert began his railroad career even before he came to M.I.T., having worked as a baggage master and station agent. In his freshman year he won the competitive military drill prize. A frequent attendant at our reunions, he will be much missed. He leaves a widow, three sons, and a daughter.

Charles F. Koch, whom Course II men remember as a faithful worker and agreeable fellow student, died on February 17. Shortly after graduation, he joined his brother in the formation of the Cambridge Tile Manufacturing Company of Covington, Ky., and continued in the operation of that plant until 1912, at which time they sold their interests. The National Sales Corporation was then formed, with headquarters in Cincinnati, to supply chemicals and nonmetallic minerals to the ceramic and metallurgical industries. This company continues in business, and Koch was vice-president at the time of his death, though he had not been in good health for several years. He is survived by his wife, a son, and a daughter. — GEORGE A. PACKARD, *Secretary*, 50 Congress Street, Boston, Mass. HARRY M. GOODWIN, *Assistant Secretary*, Room 4-242, M.I.T., Cambridge, Mass.

1891

Our friend and classmate, Elisha B. Bird, died in Philadelphia on April 9. He had not been well for some time and not long ago went through some serious operations, from which he never fully recovered. Several classmates attended the funeral, which was held in Boston. We shall miss him, not only because through the years he was a regular attendant at our parties and helped make them more enjoyable, not only because of his kindly spirit and friendly ways, but also because of his unusual gift as an artist, which gave much pleasure to all in our Class, whether or not they knew him personally.

In our student days Elisha drew the pictures for our banquets and for "Technique." On our anniversary reunions he illustrated our booklets, prepared letterheads and announcements for us, and as a final gift to the Class designed the beautiful cover for our fiftieth reunion book. To this last work for us, he gave much time and thought. The book is a fitting tribute to the Class of 1891. Few there are to whom class associations and friendships meant so much. Many others in M.I.T. know of Elisha Bird and his work. As a designer of bookplates, he stood high in his profession, and his reputation was country-wide.

The following account of Elisha's business and artistic career gives only an inadequate picture of his devotion to his lifework. As far as we, his classmates, are concerned, he had no competitor and can have no successor. We quote from the Boston *Herald* of April 10: "Elisha B. Bird, nationally known illustrator and president of the American Society of Bookplate Designers and Collectors, died . . . in Philadelphia. . . . He was 75 years old.

"Born in Dorchester, he attended Massachusetts Institute of Technology, where he was student editor of 'Technique,' undergraduate publication. After graduation, he worked as illustrator for The Herald, and was one of the first to cartoon baseball players in action. Later, he was employed in art departments of other newspapers, and for more than 15 years prior to his retirement in 1939, served in the art department of the New York Times. Collections of his work are in the New York Public Library and at Harvard, Yale and Princeton Universities, M.I.T., and the Library of Congress. He leaves his widow, Mrs. Elizabeth Bird of Philadelphia, and a son, Jack Bird of Framingham." — HENRY A. FISKE, *Secretary*, Grinnell Company, Inc., 260 West Exchange Street, Providence, R.I.

1892

The resolutions on William R. Kales as prepared by the class committee are as follows:

"The sudden death of William R. Kales on December 3, 1942, was a great shock to the members of the Class of 1892 of the Massachusetts Institute of Technology. Now that he is gone, there has been a rush of words to appraise him, but to write about Kales as one who is no longer with us is a task difficult to face, for it is hard to think of the Class of 1892 without him. He was our leader for more than 50 years.

"While we were students at the Institute, several of the Institute's athletic organizations contained a number of representatives from our Class, but a brilliant halo rested over the name 'Kales.' The records show that he was a member of the executive committee of the Football Association, a substitute on the varsity team in our freshman year, and captain of the '92 freshmen eleven which won the contest with the '91 team and established our supremacy. In our sophomore year, Kales was an end on the varsity eleven, and he held that position through our senior year. He became president of the M.I.T. Football Association, president of the Athletic Club, and manager of the '92 baseball team. The following quotation from Chaucer was assigned to him: 'Of his stature he was even lengthe, And wonderily delyver and gret of strengthe.' In our senior year, Kales was elected president of the Class, a position he filled faithfully until his death.

"An outline of his life and the good use he made of his Technology training, which led to a wonderful achievement in life, have been depicted in The Technology Review. We here record only his sterling fellowship as a member of the Class of 1892 and as its beloved leader. We happily recall his generous hospitality in entertaining the Class at two of its reunions at his summer residence at Harwich Port. The promoting of true comradeship and the happiness of others typify traits of his character. His sustaining interest in the Class and in the Institute as a life member of the Corporation was exceptionally keen. Loyalty, courage, and friendliness were his portion in this life.

"Now he is gone. Remembering that he lived generously and labored faithfully, may we enter into his ongoing with the sure and certain hope that God, in good time, will perfect the imperfect life and labor of all His children.

"Resolved that in the death of William Robert Kales, the President of the Class of 1892 of the Massachusetts Institute of Technology from 1891 to 1943, the Class has suffered a great loss; and resolved that this tribute to his memory be spread on the records of the Class, and that a copy of this record be sent to his family, to whom the Class extends profound sympathy in their greater loss.

"Signed by the Committee of the Class of 1892: J. Scott Parrish, Charles E. Fuller, W. Spencer Hutchinson, and Charles F. Park."

Winthrop L. Tidd died at his home in Taunton, Mass., on April 10. Tidd was always interested in community activities. He served for several years on the school committee in Taunton, and he was active in the affairs of the Episcopal church. He was vice-president of the Merchants Co-operative Bank. He is survived by two sons, a sister, and three grandchildren. — Notice has been received of the death of F. Patterson Smith on April 2. — CHARLES F. PARK, *Secretary*, Room 5-111, M.I.T., Cambridge, Mass.

1893

The 50th anniversary reunion of the Class will be held at The Country Club in Brookline, Mass., on Saturday, June 5. In the morning, the Class will assemble at the Copley-Plaza Hotel in Boston, whence transportation will be provided to and from The Country Club. Because of the war, it was deemed best to make the event a one-day stag affair in greater Boston. The Class seems fated to have its major reunions fall in war periods. The 25th anniversary in 1918, during the first World War, was likewise an event of a single day at Marblehead Neck. What about the 75th?

Charles M. Spofford, Vice-president of the American Society of Civil Engineers,

1893 Continued

is one of 26 members of the advisory committee on the investigation of long-span suspension bridges. This committee, appointed by the public roads administration of the Federal Works Agency, held a series of meetings on the Pacific Coast during the week of May 10. Previously, Professor Spofford had served as chairman of the society's committee to report on the investigations of the failure of the Tacoma suspension bridge.

Walter I. Swanton, formerly with the Bureau of Reclamation and prominent in civic affairs in Washington, D. C., is retired and is now living at 232 North Stanwood Road, Bexley, Columbus, Ohio. His son, Walter F.'33, was graduated from Technology in Chemical Engineering. — William F. Lamb is president of Cunningham, Lamb and Prince, Inc., wholesale lumber dealers, 16 Dorrance Street, Charlestown, Mass. — Warren E. Brooks is vice-president, director, and engineering consultant of the Wisconsin Valley Improvement Company at Wausau, Wis. This company is engaged in the conservation of water and the regulation of stream flow through the power plants and mills in the valley of the Wisconsin River.

Howard R. Barton is mechanical engineer with Westcott and Mapes, Inc., consulting engineers, 139 Orange Street, New Haven, Conn., and is living at 104 Wakefield Street, Hamden, Conn. Previously he had been power engineer of the Long Island Lighting Company at Mineola, N.Y. His son, Alfred P.'40, was graduated from the Institute's Course in Chemical Engineering.

The following account of Harley W. Morrill, who died on April 2, appeared in the Springfield, Mass., *Union:* "Harley Winslow Morrill, former president of the Springfield Co-operative Bank and chairman of the board and a former agent of the Ludlow Manufacturing Associates, died . . . in his home at 60 Dartmouth Street. Mr. Morrill was agent of the Ludlow concern at the time it erected its plant in Calcutta, India, and went there and personally supervised the building of that plant. He took an active part in Ludlow town affairs for many years. He was widely known in banking circles and was a director of the Co-operative Central Bank of this state.

"Mr. Morrill was born in Penacook, N.H., March 25, 1872, son of George W. and Clara Moody Morrill. . . . He attended the elementary schools of Penacook and Concord, N.H., and the high school at Concord, N.H. He took a special engineering course at Massachusetts Institute of Technology. . . .

"He was employed by the Concord, N.H., Street Department for a year after completing his engineering course and then became a surveyor for the Pennsylvania Railroad, working out of Philadelphia and Washington for three years. He then became assistant yardmaster and engineer of the New York, New Haven & Hartford Railroad with headquarters at Framingham. He designed and supervised the building of several bridges for the railroad. . . . In 1901 he was engaged by the Ludlow Manufacturing Associates to supervise the building of the Red Bridge power dam. . . . In 1902, Mr. Morrill was made superintendent of No. 8 mill of the Ludlow Associates, holding this position until 1908 when he was appointed assistant superintendent of the entire plant. . . . In 1912 he was promoted to assistant agent and in 1914 was named agent. . . . This was the highest position in the entire concern outside of the Boston office and Mr. Morrill held it until 1929, great advances being made under his leadership.

"In May, 1923, he was elected president of the Springfield Co-operative Bank. . . . After retiring as agent of the Ludlow Associates and becoming a vice-president of the mill, he devoted a great deal of time to his co-operative bank duties. His influence in co-operative banking circles spread outside the city to state circles and he was active for many years in the Central Co-operative Bank. . . . He was interested in modeling and building boats and . . . built a number of ship models. Travel, the study of geography and walking were hobbies of Mr. Morrill. He made three complete cruises around the world and used to take long hikes almost daily. For more than 20 years Mr. Morrill was a member of the Springfield Rotary Club. He was a member of Penacook Lodge of Masons for many years and of the Engineering Society of America. He married Lillian Sargent of Penacook, N.H. in 1898. She survives as do a daughter, Mrs. Mildred M. Cummings of Ludlow, and two grandsons, Edward Cummings of the United States Army and Robert Cummings, a student at M.I.T." — FREDERIC H. FAY, *Secretary*, 11 Beacon Street, Boston, Mass. GEORGE B. GLIDDEN, *Assistant Secretary*, 551 Tremont Street, Boston, Mass.

1894

In the notes for the April issue, the Secretary wrote regarding the death of Ike Hazelton on January 27. After the notes had gone to press, someone sent in a page from *Adventure*, from which the following is quoted: "The illustrations in this issue for 'Last Boat from Zamboanga' are the last we shall see with the familiar I.B.H. down in the corner. . . . An artist of varied talents and great versatility he is known for his advertising work, magazine and book illustration and portraiture. In the first category he will be remembered by many people for the 'Clicquot Kid' the laughing Esquimau youngster he created to advertise Clicquot Club ginger ale for so many years. About a year ago he did a remarkable series of color ads for Willys-Overland depicting the mechanized war equipment the company is now manufacturing. These stirring pictures of jeeps, tanks, scout cars and so on were widely reproduced. . . . The shock of his passing leaves a gap in the pages of *Adventure* that will not be filled easily and we mourn him as a friend as well as staff associate."

George Owen, Professor Emeritus of Naval Architecture, who retired in June, 1941, has recently joined Gibbs and Cox, a leading firm of naval architects, which is playing an extremely important part in the present-day program of shipbuilding by furnishing plans for many types of naval vessels and merchant ships. Gibbs and Cox is developing a school to teach the principles involved in the creation of a ship to its rapidly increasing personnel. Owen will have an important part in the development of this school. His long experience as a designer and expert in construction, as well as a teacher, makes him especially valuable in this work. His work will be largely administrative, but he will probably also teach.

After his many years of professional work, George is certainly especially well fitted for such a field of service, and both he and the firm to which he is now attached are to be congratulated. Incidentally, this is a good illustration of the way in which a retired technical professor can be especially useful in time of war or when a shortage of expert scientific talent occurs. A record of the consulting services now being carried on by retired professors would be extremely impressive.

George Taber, now retired and living in Reading, spends part of his time writing verses. His verses have grace and rhythm, and the themes range from the humorous to idealistic. — Arthur Shurcliff and his son, widely recognized as landscape architects and planners, have an office at 14 Beacon Street, Boston. — Walter V. Brown has returned to 24 Hamilton Road, Glen Ridge, N.J., from Orlando, Fla.—Notice has been received of the change of address of Arthur Patrick from Cleveland to Box 41, Centerville, Mass. The Secretary wonders if this is a permanent address.

Announcement has just been made of the award of the Nicolas Appert Medal by the Institute of Food Technologists to Samuel C. Prescott. The award is to be made on June 2 at the society's meeting in St. Louis. This medal award was established by the Chicago section of the society, and is awarded by a jury of nine top-ranking food technologists representing all sections of the country and the food industry. The Secretary appreciates the great honor that has come to him, and hopes he has proved worthy of the distinction that has been conferred. — SAMUEL C. PRESCOTT, *Secretary*, Room 3–233, M.I.T., Cambridge, Mass.

1895

A recent letter from Sid Clapp in Kingston, N.Y., referred to a very interesting article on quicksand by Gerry Matthes in the February issue of the *Military Engineer*. Matthes is still engineer with the Mississippi River Experiment Station, with headquarters at Vicksburg, Miss. — Sid is still with the Board of Water Supply of the city of New York. He says that the scarcity of gasoline has kept Mrs. Clapp and him close to home this winter. They had planned a trip to Mexico, but the war has interfered with their program.

George Abram Nichols, IV, who studied at the Institute during 1890–1891, and

1895 Continued

then finished his work with the Class from 1892 on, died at his home, 111 Wellington Road, Garden City, N.Y., on February 26. George had worked in New Haven, Conn., for a number of years, and was afterward located in New York City. During the depression years he moved to Silver Spring, Md., for a time, and then returned to New York, where he continued in business until he died. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

1896

In the last letter received from Lloyd Wayne in Indianapolis, he reported that his period of convalescence in the hospital was about ended and he expected to be discharged within a few days bearing a doctor's report that he was again as good as new. — Marsh Leighton in Washington says that he is a busy man these days, but in spite of that he does find a few spare minutes occasionally when he picks up the '96 class book and gets much comfort and satisfaction out of reading it. — Gene Laws on the Laws' farm outside of Fitchburgh, Mass., reports that they have had a hard winter in that section, but are coming through in good shape. He fears that it will be impossible for him to do all the farming this year that he should do because of present conditions.

Bradley Stoughton has been elected to the board of directors of the Lukens Steel Company, and he writes from Washington that he is very much tied up now, giving part of his time to Lehigh and part to the War Production Board. He is now on his third year in Washington; he has been professor of metallurgy at Lehigh University since 1932; and he has at times been associated with several prominent steel companies. The only '96 man he has run across in Washington so far has been Marsh Leighton. — It transpires that Billy Anderson was in New York City the early part of February and could have arranged to attend the gathering of the '96 bunch there if he had only known about it. He was in New York to see his son, who had been promoted to lieutenant, senior grade, in the Navy and had been given command of a patrol boat.

The Myron Fullers continue on at Fulton Cottages, Rural Free Delivery, Rockport, Texas, and say that they like the cottage overlooking the Gulf so much that they plan to remain there all summer, and possibly longer. — Irv Merrell down in St. Petersburg, Fla., reported fine weather during April. He had the pleasure of a call from B. R. T. Collins, the genial Secretary of the Class of '88, who was spending a month at Pass-A-Grille Beach. — Charlie Tucker in North Andover has taken on a new job as registrar of the Brigadier General Joseph Frye chapter of the Sons of the American Revolution. The chapter was formed during the past year and now has 64 members, with more in sight. They have an outstanding speaker at their dinner meetings, which they hold once a month. On February 26, Lythgoe gave a very interesting talk on the food situation. Mrs. Lythgoe was also a guest at that meeting. The Secretary inferred from Charlie's letter that much of his clerical work as registrar was actually being passed along to Mrs. Tucker.

Victor Shaw in California took on again this year the job as lookout in the Angeles National Forest, starting May 1 and continuing until about the middle of December. After that he may do some prospecting in Arizona and may also locate somewhere in the hills, possibly in the northern part of California, and do a little fiction writing again. — John Ashton says that it will be 50 years this summer that he will have been in architectural business in Lawrence, and during all these years his office has never been closed. The last job, however, was completed last September, and no other job has appeared since. A great many school buildings in New England are the product of the firm of Ashton and Huntress. — One day in March, the Secretary had a very enjoyable call from Butler Ames. Butler's brain still continues most active, and it was interesting to hear about one of Butler's brain children — a very intriguing form of electric oven.

After a liquidation period of several years, the final dividend of 2.16 per cent in the liquidation of the Central Trust Company has been received, thus making a total payment of 52.16 per cent. Assets are now completely exhausted, and the balance can be definitely entered as a loss to the class treasury.

The Secretary is indebted to Paul Litchfield for a complimentary copy of the recent book entitled *House of Goodyear*, which is most interesting and at times almost romantic reading. From the same source have also come two issues of the new magazine of the Goodyear Aircraft Corporation entitled *Alert*, which inaugurates a high standard among house organs of industrial concerns.

It is with the greatest regret that the Secretaries report the sudden death of William R. Hedge on April 19. He had been in excellent health, and on April 17 was in his office attending to his duties as president of the Boston Insurance Company. He played golf the next day, and presumably was still in his usual health, but the end came suddenly not long after midnight. He will be remembered by practically all of our classmates as one of the Hedge twins. He and his brother Henry have kept together all through their lives, from the time of their birth in Plymouth, Mass., through their school days and through their business careers, Henry being the vice-president of the Boston Insurance Company. Services were held at noon on Wednesday, April 21, in the First Church of Plymouth. In addition to his widow, the former Miss Alice P. Nowell, he leaves three daughters, the Misses Alice N., Lucia R., and Susan Hedge; his twin brother, Henry; and a sister, Lucia R. Hedge of Plymouth. Will Hedge was one of our loyal classmates who never missed attendance at class gatherings and reunions. He also occupied a high position in the business world. During the period when he served as term member on the M.I.T. Corporation, his financial knowledge made him very valuable. — CHARLES E LOCKE, *Secretary*, Room 8-109, M.I.T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

1897

Thomas C. Atwood died at Durham, N.C., on February 2. We have recently received from Proctor L. Dougherty of Washington, D.C., the following account of Atwood's professional activity in the various fields in which he engaged: "Atwood was born in Provincetown, Mass., in 1874. . . . Among the important engineering positions he held were those of assistant engineer in the Bureau of Filtration, Philadelphia; division engineer in charge of the preparatory field work on the extension of the Catskill Aqueduct in New York City; and construction manager of the Yale Bowl. In 1924 he became president of Atwood and Nash, Inc., Chapel Hill, and from 1931 to the time of his death he was president of Atwood and Weeks, Inc., Durham.

"In 1942, Atwood was elected a life member of the American Society of Civil Engineers. He had been a leader in civic and religious life for the last 20 years and was very active in the First Presbyterian Church, having been a member of the board of elders for many years. He was very active in the local chapter of the A.S.C.E., in which he held practically all the offices, including that of president. He was a veteran of the Spanish-American War and was quite active in the local veterans' post. He is survived by his wife, Grace W. Atwood, and two sons, Theodore W. and Robert C. Atwood."

H. Raymond Weeks, Atwood's partner, sent us the following tribute: "Mr. Atwood was held in very high esteem by his colleagues and all who knew him as a representative of the highest type of ethical business conduct. It was my privilege to be associated with him ever since I finished college, and this association had a profound influence on me. He belonged to the very best type of old New England stock, in which honesty and integrity in dealing with his fellow men were primary qualities. . . ." — JOHN A. COLLINS, JR., *Secretary*, 20 Quincy Street, Lawrence, Mass.

1898

The leading article of the February 26 *Science* is a lecture which Dr. C.-E. A. Winslow presented before the Health Education Institute meeting in St. Louis. The article is entitled "Health Education in a Democracy." Dr. Winslow asserts that the positive principle of the upbuilding of health should receive emphasis, rather than the negative prevention of disease. He says that training is a necessary preliminary to education. Education is not possible for a dog, but education is possible for a man, outside of Germany or Japan, where nothing but training is permitted.

We have before us a little book entitled *Green Fields and Golden Apples*, by Colonel Harold Wellington Jones, librarian of the Army Medical Library, Washington, D.C.

1898 Continued

It contains 41 short essays, two of which are named in the title. We take the following from the announcement of the publisher, John D. Lucas Company, Baltimore, Md.: "This is only one of a series of books, articles, and essays written by Colonel Jones. His style is individual and snappy. The author is human and writes about humans in a human fashion. . . .

"Colonel Jones has been an officer in the United States Army for more than thirty-seven years. He served in the Philippines in the early days of our occupation. He was a delegate to the Indian Medical Congress a third of a century ago and he knew Ross, Leonard Rogers, and Castellani in those years. He has traveled extensively in the Far East and has crossed the Pacific Ocean nine times. He visited Japan many times and saw Siam and the Dutch possessions. He was with the A.E.F. in 1918, commanding the huge Hospital Center of more than 20,000 men at Beau Désert. He has served in the Hawaiian Islands, in Mexico, and at sea. He was chief of our military medical delegation to Roumania in 1937 and was a member of the Geneva Commission of Army and Navy Experts. Colonel Jones was also Secretary General of the 10th International Congress of Military Medicine held in Washington in 1939. As President of the Medical Library Association and Editor of its Bulletin, his work is outstanding."

We have received a copy of a long syndicated article by Roger Babson. Part of it reads as follows: "Having raised and given several millions of dollars to educational institutions — including the Babson Institute and Webber College — I must say a word relative to the Army's latest college ideas. Doubtless the long-established plan of letting money be such a factor in deciding who goes to college is wrong. Because a boy's parents can afford to send him to college is no reason why he should go; or because the parents have not the money is no reason why he should not go. The Army is right in ruling out the evidence of whether or not parents have the necessary money.

"On the other hand, as the late President Lowell of Harvard College believed, the selection of boys according to their I.Q.'s is simply crazy. In fact, even the marks which boys get in high school are largely due to their good memories rather than to their good judgments. Yet, we all know that it's judgment and courage which count in the end — the ability to say 'yes' and 'no' at the right times when so-called opportunities develop. . . ."

Charley Wing sent us the following clipping from the Boston *Herald* about the death of Charles Pease on March 31: "Charles H. Pease, owner of the Monadnock Blanket Mills, a concern founded in 1869 and operated for many years by his father, died suddenly . . . in Orlando, Fla. . . . Mr. Pease was born in Marlboro, N.H., Sept. 18, 1875, attended Marlboro schools and was graduated from Keene High School in 1894. Following his graduation from the Massachusetts Institute of Technology, he returned to this town to learn the mill business. ". . . For many years he was director of the Cheshire County Y.M.C.A. He was prominent in the Federated Church and had been a member of the school board. He is survived by his widow, the former Mabel Clark Proctor of Somerville, Mass."

We have also received a clipping from the Boston *Herald* about the death of Benjamin F. W. Russell on February 11 in Santa Barbara, Calif. The notice read, in part: "Born in Boston, the son of Benjamin F. and Phebe Gardner Russell of Nantucket, he was graduated in 1898 from Massachusetts Institute of Technology. He first practiced his profession in the office of Guy Lowell, and in 1915 became a partner in the firm of Little and Russell. The office was closed a year ago and he had been visiting relatives in California.

"He was a member of Delta Kappa Epsilon, the Union Club of Boston, the Brookline Country Club, the American Institute of Architects and the Nantucket Yacht Club. He was a director of the Peterborough, N.H., hospital, and maintained summer homes there and on Nantucket. He leaves his widow, Mrs. Sarah Knapp Russell, formerly of Chicago, and three daughters. . . ."

We also report the death on January 25 of Harry A. Curtis, at 381 Park Avenue, New York City. — ARTHUR A. BLANCHARD, *Secretary*, Room 6-421, M.I.T., Cambridge, Mass.

1900

Charlie Smith sent in a letter which Clinton Thurber wrote him, concerning an examination they took with Frederick Cooke and several other '00 men in 1903. Thurber wrote, in part: "How ironical was the result of that exam! The Navy set itself the job of getting the best men possible, and with great skill and cunning devised rules, regulations, and tests to that end. We three passed in one, two, three order — all Technology men and, what was more remarkable, all '00 men! And so close was the race among the three '00 men that during the exam those cunning examiners became suspicious — could those three men have some secret code? Could there be any chance that our competitors, who were lagging behind, might later raise the issue of collusion? The examiners discovered that if the seating of the candidates were rearranged alphabetically, it would widely separate the three '00 men, who had up to that time been sitting side by side.

"Then came the irony. On some technical ruling, they threw you down on the physical. Well, they guessed wrong, for of the two they accepted, Freddie is gone; I am on the shelf, restricted by my poor health; and you are still kicking up like a colt."

From Jim Batcheller, our never-failing source of supply in Point Lookout, Sunset Hill, Corvallis, Ore., comes a most welcome letter, as follows: "I have but recently returned from a short visit to Seattle. I went there to see Bob Leach, while he was making a short visit with his wife at the home of one of their four daughters. He is well and busy, as some of his company's output is used in the Navy as well as in many war industries. In May, the famous old Franklin Institute in Philadelphia, Pa., gave a banquet (I guess a dinner is all the Office of Price Administration will allow) in Bob's honor, at which time he was presented with the Institute's Wetherill Medal because of his achievements in metallurgical development.

"I am still not in good health, but though my improvement is slow, I am encouraged to believe it will continue. I have to lead a life of idle resting, which becomes irksome, especially at this time. Since I can exert myself only very little, I spend a good deal of time writing to my four sons and their families. Two of the boys are commissioned officers in the Navy, one is a captain in the Army Field Artillery, and one is a foreman in a Curtiss-Wright factory. I'll be glad when 'the duration' is over, and I certainly hope that will be before our scheduled class reunion in 1945. Unless something very important arises, I doubt if I move far from here during active hostilities."

The sympathy of the Class is extended to John V. Beckman, Jr., whose wife, Susan Warren, passed away on March 31 at West Newton. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

1903

An unsuccessful attempt was made through George Garcelon, who is manager of the industrial control engineering department of the Westinghouse Electric and Manufacturing Company, East Pittsburgh, and through William Leathers, who is retired and living in Sarasota, Fla., to find out about the career of James M. Gammons, who died in St. Petersburg, Fla., on November 2. We should be glad to get further word about him.

We have just received the news of the death of Sheldon K. Baker, XI, on July 12 in La Jolla, Calif. He and his family were vacationing there from their home in Phoenix, Ariz. We received the following news item from the Phoenix *Gazette* of July 14: "A graduate of the Massachusetts Institute of Technology, Mr. Baker came to Phoenix in 1905 as an irrigation development engineer for the Salt River Valley project and soon became established as outstanding in his profession. He was with the U. S. Reclamation Service from 1906 to 1914, and in addition to the Salt River project, he worked on design and construction of distribution works on the Shoshone and Lower Yellowstone projects. Since 1914 he has engaged in private practice of general engineering, including irrigation, underground water development, land subdivision and townsite development and electric power distribution. . . . From 1935 to 1939 he was consultant for the National Resources Committee, assigned to the Arizona State Planning Board." — Surviving Baker are his wife and two daughters.

The Class will remember S. K. as the third and smallest of the Bakers. H. S., who was the long distance runner, is the

1903 Continued

only survivor. He is now living in Pennington, N.J. A. P. Baker died in 1904.

We were pleased that Samuel Porter's son was interested in looking up his father's classmates in Boston a short time ago. The son is in the Canadian Navy and was visiting during a short furlough. He says his father is partly retired from the Canadian Pacific Railway Company, where he was in charge of its department of natural resources. He would like to visit Boston during the class reunion in June but is afraid it will be impossible because of difficulties and restrictions on travel. It's a long way from Calgary, Alberta, to Boston. — FREDERIC A. EUSTIS, *Secretary*, 131 State Street, Boston, Mass. JAMES A. CUSHMAN, *Assistant Secretary*, 441 Stuart Street, Boston, Mass.

1905

John Eadie, VI, of Edinburgh, Scotland, writes: "I came to Edinburgh because the schools here are first-class, and my boy had to be educated. That is over now, and I am glad to say he has done well. He took the special entry examination for the Royal Marines and Navy. His eyesight was not up to Navy standards, but he was accepted by the Royal Marines. This is a competitive examination for 20 permanent commissions each year. He is now a second lieutenant.

"Two years ago a friend asked me to help in an engineer's office. I was glad to do so because I did not care to be idle in these times, and I was glad to earn some money, for taxation has increased to 50 per cent of income. Edinburgh is very fortunate. We have few air raids as we are farther from enemy airfields than most cities. The nearest enemy bases are 400 miles away — too far to send fighters. No one here runs a motorcar for pleasure, as petrol is strictly for business purposes, and we are all discouraged from traveling. All these restrictions make life a cycle of work and sleep, with few pleasures." In appreciation of this fine letter, your Secretary wrote John a brief account of all his Course VI mates.

Roy H. Allen, III, who was formerly chief engineer of William Sayles and Son in Albany and is now in Morenci, Ariz., as supervising engineer of the Defense Plant Corporation, writes that he is dividing his time between three sizable mining and metallurgical plants in southwestern United States and one in South America. — Recently the front page of a newspaper in Fort Worth, Texas, carried a photograph of officials present at the dedication of the new plant of the American Cyanamid Company. The biggest smile in the picture belonged to Bill Spalding, transferred from New York to be general manager. Bill said: "We hope to provide the energy to propel the celebrated bombers which will blast Hitler and Hirohito off the face of the earth." He writes: "I have changed my address and am now proud to live deep in the heart of Texas. 'Box 7, Fort Worth' will reach me, but I haven't found a permanent residence yet, as the construction of homes hasn't kept up to industrial growth."

At the last ceremonial of the Aleppo Temple of the Mystic Shrine in Boston, I sat with Wesley Gilman, II, who surprised me with the information that he was made a Noble of the Mystic Shrine just a few days after graduation. I will inform any classmate attending these ceremonials just where to find Gillie, for he has occupied the same seat for 38 years. Ralph Hadley, I, was also in attendance. — FRED W. GOLDTHWAIT, *Secretary*, 274 Franklin Street, Boston, Mass. SIDNEY T. STRICKLAND, *Assistant Secretary*, 137 Newbury Street, Boston, Mass.

1906

On April 8, your Secretary had the pleasure of attending a meeting of the Boston section of the American Society of Mechanical Engineers. The speaker was our classmate, Harold V. Coes, who is now national president of the society. Harold's subject was "The Impact of Accelerated Scientific Research." President Coes's paper emphasized the progress which has been made along technical lines as a result of the war research. Among a few items mentioned were the increased production of lighter metals such as aluminum and magnesium, the development of new alloys with high tensile strengths, the progress with plastics, and the synthetic rubber program. The effect of these upon our postwar mode of living will result in great changes in transportation, both on land and in the air, in housing, and in many other items. The application of these new developments will present problems for the engineering profession. The meeting was well attended, and the long discussion after the meeting demonstrated the interest aroused by Harold's excellent paper.

The Stamford, Conn., *Advocate* of February 24 published an account of a meeting of the Stamford Inter-Faith Committee. One of the speakers of the meeting was Rev. Michael J. Ahern, S.J., who was referred to in the *Advocate* as a "noted Catholic leader and distinguished theologist and chemist." He told of the work of the National Conference of Christians and Jews and declared that its influence is becoming widespread. He remarked that great progress has been made in science during his time, and "Yet, this progress and command of man over nature has not been controlled because of men without conscience or intellect."

Classmates will be grieved to learn of the death of one of our most enthusiastic '06 men, Robert J. Lyons, XIII, who passed away very suddenly on January 13. Bob had been with the Coleman Disposal Company at 245 State Street, Boston, for over 10 years. Previous to that, he had been with the Amoskeag Manufacturing Company, Manchester, N.H. Bob never married, but made his home with his sisters at 48 Reservoir Street, Cambridge. Classmates will recall him as a congenial, sociable member, who enjoyed life and spread his good cheer to those with whom he came in contact. He was very faithful in his attendance at class functions, and his presence on such occasions contributed to the enjoyment of others. His passing is a severe loss to the Class. — JAMES W. KIDDER, *Secretary*, Room 801, 50 Oliver Street, Boston, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills, Mass.

1907

Octavus L. Peabody, familiarly and affectionately known to us all as "Peabo," who has been our class representative on the Alumni Council for about three years, has asked us to accept his resignation. Because of poor health, he is no longer able to attend the meetings. With full appreciation of his services and of his continuing keen interest in the Institute and in class affairs, we have acceded to his request. We have prevailed upon Lawrie Allen to become our representative in Peabo's place. At the meeting of the Executive Committee of the Alumni Association on April 26, Lawrie was elected.

During April we heard from Franklin O. Adams, one of our class architects, who has consistently stuck to his profession and who for the last 10 or 12 years has been in business alone and in his own name. His office is at 305 Morgan Street, Tampa, Fla., and his residence at 610 North A Street in the same city. He has served in advisory capacities for various Federal construction boards in Florida, has been chairman of the Florida State Board of Architecture, has been chairman of the Tampa Art Museum board of management, and is at present chairman of the board for the juvenile detention home of Hillsborough County, Fla., chairman of the public works section of the County Defense Council, and chairman of the City of Tampa Zoning Commission. He is also a member of the jury of fellows which awards fellowships in the American Institute of Architects. Franklin has a son 27 years old, who unfortunately is an invalid; also a daughter, 24, who was graduated from the law school of Vanderbilt University in 1942 and is now practicing law in Tampa.

Wheaton Griffin of Utica, N.Y., thoughtfully sent me a clipping from the New York *Herald Tribune* telling of the marriage of his only daughter, Elida, to Captain Owen Silas Ogden, Medical Corps, United States Army, on March 23. The ceremony was performed in the Central Presbyterian Church in New York City. Mrs. Ogden was graduated from Utica Country Day School and from Vassar College, and is on the editorial staff of *Fortune* in New York. A cut of the two fine-looking young people appeared in the clipping. — BRYANT NICHOLS, *Secretary*, 23 Leland Road, Whitinsville, Mass. HAROLD S. WONSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1909

Don't be modest or bashful about sending news items to your Secretaries, for all of us are more than interested in what you and everyone else in the Class are doing. If you have a hobby, if you or any member of your family has done anything of interest, or if you have joined the armed forces, just write to Paul or Chet.

1909 Continued

The Review Secretary apologizes for an error which appears in the April notes. "Bob" Hutchinson should, of course, have been "Ned" Hutchinson. Also Henry Spencer's name was inadvertently omitted from the list of those who attended the Alumni Banquet.

The Class is well represented in the administration of the New England Water Works Association. Horace L. Clark, I, is senior vice-president and acting president. In the natural course of events Horace will be president next year. Art Shaw, also I, is one of the directors. Horace is superintendent and general manager of the Sanford Water District, Sanford, Maine. According to the class records he has been in Sanford since 1932. Many of us remember Horace as one of the tackles on the old '09 football team. — Probably most of you have had the pleasure of voting on the recent ballot for Art to be our class representative on the Alumni Council.

Brad Dewey has been elected to membership as a fellow in the American Academy of Arts and Sciences, the headquarters of which are 28 Newbury Street, Boston. Membership in the academy signifies that one has attained distinction in his field of effort. All parts of the world are represented in the membership. — PAUL M. WISWALL, *Secretary*, 90 Hillside Avenue, Glen Ridge, N.J. CHESTER L. DAWES, *Review Secretary*, Pierce Hall, Harvard University, Cambridge, Mass. *Assistant Secretaries:* MAURICE R. SCHARFF, 235 Second Street, Southeast, Washington, D.C.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

1911

Thirty-two years ago (ouch, that's a long time!) members of the Class of '11 marched into old Huntington Hall at the Institute on Boylston Street, led by our first marshal, Ted Parker, I. He received his S.B. degree in Civil Engineering, and now — effective July 1 — he is coming back to his alma mater to head that Department. A story about Ted's appointment and career appeared in "The Institute Gazette" in the May Review. Our pride in his accomplishments knows no bounds, and we know he will be a tower of strength to the Institute. It'll be great to have you back in New England, Ted.

Speaking of accomplishments, tie this one! A pretty blue-rimmed announcement came from Colonel and Mrs. Carl G. Richmond, 5417 Mohican Road, Friendship, D.C.: "Charles Stewart Richmond, April 6, 1943; weight, 8 pounds; Walter Reed General Hospital, Washington, D.C." Double congratulations, Carl — to you and Helen on the new baby, and to you on the promotion to a full colonelcy!

It looks as if our Lieutenant General George Kenney, I, made a successful mission to Washington for General MacArthur and at last Stimson is going to send more planes into the South Pacific area, where Kenney is head of the United Nations air armada. While in Washington, he was awarded another Distinguished Service Cross and a Purple Heart. Speaking for publication for the first time since his return from his mission to the capital, George said in mid-April: "I'll be pleased when we have the Jap planes outnumbered five to one — there's no indication now that the Jap wants to pick up his bags and go back home. In daily combat we are doing pretty well, but the Jap has too many airplanes around to suit me. I don't like to be outnumbered."

As of April, the Class of '11 had 16 men in the Army, two in the Navy, and one in the Coast Guard. For a complete list, see "M.I.T. Men at War" in The Review each month. We have a fine showing, and our hats are off to you, classmates in the armed services!

In his baccalaureate address to the graduating class at Northeastern University's "speeded-up" commencement in April, our Carl S. Ell, I, President of the university, warned his seniors that "a nation can perish from within as well as from without" and urged that "we must not lose our perspective in the midst of the titanic struggle of global war, which has tended to block the stream of culture and learning. . . ."

Commenting editorially, the Boston *Traveler* said, in part: "President Carl S. Ell of Northeastern University gave a much-needed warning in his baccalaureate address to those young men who are passing from the academic routine which is youth's normal heritage to the field of supreme service which war imposes on a nation's youth. . . . The pre-emptory call of the present always tends to deafen the warning voice of the past and the pleading voice of the future. This is poignantly true when the present is the sort we labor under today. We must always remember that today is an arrow shot at the target of tomorrow."

Under the able chairmanship of Bancroft Hill, I, Baltimore's postwar planning committee made its first report in late March, embodying a plan to assure business and industry funds after the war for rehabilitation and maintenance that must be deferred during the war. The scheme would call for the issuance by the Federal Treasury of a special short-term "maintenance bond" in which such funds would be invested "without tax penalty." The bonds would be redeemed by the government over a period of three or four years after the termination of hostilities, probably in installments every six months. Other reports are to follow with practical plans worked up in detail. Nice going, Ban!

My first letters to classmates in behalf of Alumni Fund IV apparently beat the official letters from headquarters. I've received some fine letters from prompt '11 men, who sent in their pledges directly. Moral: It pays to be prompt. Phil Caldwell, I, from the New York office of the Robertson Paper Box Company, Inc., said he had dinner recently with Larry Odell, XIV, from whom we have heard nothing for lo these many years. "Larry had a little hard luck," he writes, "in that his company was driven out of active business by the war. He is now with the Douglas Guardian Warehouse Corporation, Girard Trust Company Building, Philadelphia, Pa. . . . Two of my three sons are now in the armed forces, and I hope that my youngest son, now eight, will not get into this war or any other. My oldest boy, Phil, Jr., is a midshipman, while my 18-year-old boy, Gardner, is going through his 'boot training' at San Diego in the Marine Corps."

Minot Dennett, II, sends a grand thought from Detroit: "Have raised the ante a little this year and hope that a fair share of Classmates will be able to do likewise. Our class average should certainly be a little higher." Uh, huh, how's about it?

Bert Fryer, VI, a lumber engineer in Seattle, Wash., did himself proud with a grand letter, in which he states that he is "still working at the drying game and very busy as usual — really doing something now, at least for the industry." His field engineer has been in Australia for two years, and is now at Port Moresby. Bert writes: "Wish I could be over with him, but they tell me I'm too old for service — tried both the Army and Navy, so guess I'll have to go along with this work. My son is now general foreman for the American Can Company here in Seattle, and both my daughter and her husband are working at the local Boeing plant."

Isaac Hausman, I, President of the Hausman Steel Company, Toledo, Ohio, says he enjoys the '11 notes immensely. He proudly adds: "All three of my sons are in the service — one in the Navy and two in the Army." That's grand work! — From Montreal, Paul Kellogg, IX, reports that Stevenson and Kellogg, management engineers, "are busier than we ever dreamed of being, and some of our particular jobs are fascinating but scarcely subjects for public discussion." After wishing me success in my return to engineering, Paul concludes with: "Good old Kenney is certainly going places these days!" — Roy MacPherson, II, a lieutenant commander in the Coast Guard, writes that he has "just been transferred back to Boston — for how long no one knows, but at least I shall be with the family once in a while."

A fine letter from Bill Warner, I, reveals from its heading that Bill and T. R. McSpadden are now operating Double Diamond Ranch in Nowata, Okla. He also enclosed a snapshot of some of his herd. "Like everyone else," he writes, "my time is fully taken up every day. When not busy with the draft board, discussing with parents or employers about boys to be kept out of the Army, I am out on our ranch, where we have some good registered animals. We are trying to do a lot of work with a minimum of labor and equipment. It is interesting and healthy work, however, and, best of all, it keeps me outdoors. Both of my sons are doing well in the Army. One has a commission in the Infantry and is stationed in Texas, while the other is in Maryland in a school for adjutant generals."

From the Alumni Office comes word of the recent death of two classmates with whom we have been out of touch for a

1911 Continued

long time: Roland B. Wells, II, who died in West Somerville, Mass., on March 11, and Stanley M. Burroughs, II, who died in Belmont, Mass., on March 25.

Today's thought: Buy bonds and support the Alumni Fund — both generously! — ORVILLE B. DENISON, *Secretary*, 82 Elm Street, Worcester, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1913

Those of you who read in the May Review the Alumni Fund page entitled "1913 Sets the Pace" must have been thrilled. It was a tribute, in particular, to Dave Nason and Larry Hart, and maybe a dozen others. The 1943–1944 Fund opened in April. Let's not let down. Don't keep the load on 14 men.

We have received many new changes of address, including that of Paul C. Warner, IV, a lieutenant commander at the Naval Air Station, Camp May, N.J. — FREDERICK D. MURDOCK, *Secretary*, Murdock Webbing Company, Box 784, Pawtucket, R.I.

1914

It is with great regret that your Secretary reports the death of Otto Fick in Chicago on August 2. Fick, although somewhat older than most of the Class, was ever ready to give a helping hand or a friendly word to his mates. He was one of the few '14 men to be employed since graduation by the same company — the Liquid Carbonic Corporation.

Another brigadier general in '14! John Wood, famous for his singing colored engineers, has been promoted to the rank of brigadier general and is at Fort Huachuca, Ariz. With Alden Waitt, the Class now has two brigadiers, and to balance for the Navy, Tom Richey carries the rear admiral honors.

General Waitt has had a large number of speaking assignments throughout the country, and in connection with these speeches has called attention to the fact that there are indications that Germany may launch what is intended to be overwhelming poison gas as a surprise attack in an attempt to secure a quick decision. He has also stated that the United States does not intend to use gas unless the enemy does, but we are well prepared for this type of warfare, and if it should be started by the Germans, they will never forget the retaliatory effects.

It has come to your Secretary's attention that three more '14 men have joined the services. Max Braff is a lieutenant commander stationed at Boston. Herbert Hall of Pittsburgh is a major and is stationed at Lafayette, Ind. Lyman Baird has been commissioned a captain of an antiaircraft battery of the Coast Artillery Corps and is on duty in California. Baird, whose home is in St. Paul, had the distinction of being the only member of the Class in the undertaking business. He is proprietor of the Dampier-Baird Mortuary in St. Paul, and has been active in trade association work.

Thorn Dickinson, who has been on the West Coast for several years with Stone and Webster, is resident engineer for them on a big styrene plant to be operated in connection with the synthetic rubber program. When completed, the plant will be operated by the Dow Chemical Company and the product will be associated with butadiene being manufactured at a near-by Shell plant, and finally combined into synthetic rubber by Goodyear.

Duncan Shaw, who is president of the Reading Hardware Corporation in Reading, Pa., writes that they have completely shut down their line of builders' hardware and are now engaged entirely in making armor-piercing shells and light armor itself. — H. B. RICHMOND, *Secretary*, General Radio Company, 30 State Street, Cambridge, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York, N.Y.

1915

By the third week in April, 34 men had contributed $988 to the 1943–1944 Alumni Fund. As only contributors to the Fund get The Review, out of 144 of last year's contributors there are still 110 of you chaps reading these notes now who have not contributed this year. How about it? Send in your check (for as much as you can afford) at once and help hit 100 per cent of our quota.

A textile trade journal recently carried an article describing how George Urquhart, President of the Manville Jenckes Corporation, has finally brought to a successful close the ten-year receivership of the old Manville Jenckes Company. This is a tribute to George's splendid work and, shortly after this article appeared, I had the pleasure of a nice visit with him at his office. His son, George, Jr., '42 is a first lieutenant in the Air Forces at Wright Field.

Loring Hall, Vice-president and Director of United-Carr Fastener Corporation, Cambridge, has been spending a good deal of time recently at the company's office in Boston. He is at present on a trip to the West Coast. He took with him a list of our classmates in California, with the hope that he can see some of you fellows out there.

I wonder what Herb Anderson, President and General Manager of the Fidelity Machine Company, Philadelphia, does with his spare time. He recently was elected vice-president of the Chamber of Commerce of northeast Philadelphia and was made district chairman of the second war loan drive in his community. This news was spotted in one of the trade magazines by Larry Landers in Boston. I imagine Larry's eyesight has been sharpened by shooting at close prices in the chemical business.

Enclosing a generous check, good Bill Campbell writes as follows from the office of Brown Company, Berlin, N.H.: "I was in Washington in the Office of the Rubber Director before coming here. I just missed George Rooney, who I understand has joined Frank Creedon '18 in the construction division. . . . Now that I'm in Berlin rather than in Cincinnati, I hope to get to Boston more often to see some of the crowd."

Any of you who are in Washington shouldn't let the old corsair, Pirate Rooney, get lonesome. Jac Sindler recently had lunch with George, and shortly after that Frank Scully saw him, and then George loosened up and wrote me as follows: "Thanks for that newsy letter of yours and the Alumni Banquet menu inscribed with the names of 'old faithfuls.' I could identify every signature, but I remember when you and I have seen some of those same signatures look like greetings from Hirohito. Lloyd Chellman and I are doing all right for the Class here. Every so often when I get that lean hungry look, I get an invitation to dinner from Lloyd's lovely wife with the big blue eyes, and I accept with more alacrity than you used to accept my mother's invitations to meals. We always close these occasions by drinking a toast to that great gang of ours, and we pray for the day when those carefree reunions will be back again. I shall have to change my allegiance from the Boston Red Sox to the Washington Senators this year. Baseball looks a little dubious, and the clubs may have to get some of the old guys back to fill the line-ups. Don't count on me as a pitcher, as you should forget about that debacle at our Cotuit reunion in 1925. [Do you remember George pitching for our team against those high school boys? We had to call the game when the youngsters hit all of George's best pitches into the woods.] I wasn't feeling too good that day. It must have been the sea food served at the Pine Tree Inn." That really is a fine letter from the old Pirate. Can't you just see him bending with Lloyd Chellman some night over the doings of that rough and raucous Course I crowd?

With telepathic influence, on the same day that George's letter arrived came the following from his old Course I roustabout, Little Andy, known in undergraduate days as Mr. Anderson No. 1, to distinguish him from Herb Anderson, known as Mr. Anderson No. 2 by old Blackie in our freshman German class. Andy wrote: "Alice sent along the latest bulletin from you today so I'll get it off my mind in a hurry. I am glad Alice stayed to meet you, Azel. We enjoyed our dinner with you and hope to see you when you pass through Providence again. . . . By the way, I received my first pay check here yesterday after a wait of five weeks. The waiting was pretty tough, but the checks will come through regularly from now on. Since we went over the gang at dinner, I have no more gossip. Think that I'll drop a line to the Pirate while I'm in the writing mood. See you soon and in 1945 for sure!" — I did look Andy up again and had a nice dinner and evening with him and his wife. He is the same old boy and never changes. He had written me earlier in the year of his transfer to the Walsh-Kaiser Company, and of how he had tried to get into the Sea-Bees, but found out he was too tall, or too big, or something, and would now have to fight the war on the home front. He had seen Howdy King of the Mason and Hanger Company at the contractors'

1915 Continued

dinner and at the Moles. Howdy is still the same and looks well. He had also met St. Elmo Tower Piza at the shipyard. St. Elmo is with the Dry Dock Engineers and was looking over the yard to see what had been done with the sketches he had made. Andy says: "Plans are all right for a guide, but I believe in building by the 'there's the idea, build it' plan."

Enclosing a generous check such as he sent last year, Dave Hughes wrote from the West Coast that he thought we did very well in the 1942–1943 Alumni Fund drive. If everybody comes through this year as Dave did, our task will be easy!

After a long silence, John S. Little writes: "My new job is going all right, but we are so busy we don't have much time to think. The new communication devices coming into the picture steadily keep us at our wit's end changing plans and equipment. We are hoping to give our soldiers the very best means of transmitting information, and I believe we are doing it. That keeps us all on our toes and certainly keeps dull moments away."

Carl Dunn, 9101 South Damen Avenue, Chicago, writes: "It is a pleasure to hear from you and to learn the results of the 1915 Alumni Fund subscriptions. I do not feel particularly proud of the number of contributors to so worthy a cause and think we should do better. I am enclosing my check for the new drive. . . . More than ever, I am up to my neck in production problems for many war industries. As you no doubt know, the Bedaux Company has always been an exponent of high individual productivity as a foundation for high earning power and economical factory utilization. . . . From some of my contacts, I know that M.I.T. is making large contributions to the technique of enemy destruction, and when the story can be told we shall be proud of the activities of our Institute."

A letter from Gardner C. Wilson, 907 East King Street, Lancaster, Pa., says: "I have been with the Armstrong Cork Company at Lancaster, Pa., for nine years as project engineer in their plastics molding division. It is a fascinating field, and one that promises to go places in view of all the uses to which some of the newer plastics are being put. While our company's engineering work in this field has been concerned primarily with molded closures, since the start of the war the armed services have called on us to put plastics to work. It's a pleasure to feel the kick of being of service as a plastics engineer. I am also in the U. S. Coast Guard Reserve. I have a no-pay volunteer job on weekly patrol duty afloat, since we have organized a flotilla of which I am vice-commander. When I am on duty I am only a seaman, first class, but for the past year our group has been studying navigation, so we can merit officers' ranking as we take over more responsibilities in the Coast Guard. Possibly you have noted that I am Secretary of the Technology Club of Central Pennsylvania. This makes me fully appreciate how much there is to your job as Class Secretary, although our work is slightly different. In the past we have had three or four gatherings a year, but lately I have found it practically hopeless to get the engineers of the several counties around here away from their duties for a social get-together, so we have suspended meetings for the duration. . . . While returning from a business trip to Maine last January, I stopped in Boston to visit my mother. While there, I succumbed to a smallpox vaccination I had taken a few days before, and passed out of the picture for a while in the South Station while waiting for my train home, so I didn't get a chance to give you a buzz."

When I tell you that these last two long letters were handwritten, you can see the interest that both Carl and Willy Wilson had, to take the time to give us those splendid accounts of their activities. — So now just remember to send that check for the Alumni Fund to "help Azel." — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline, Mass.

1916

It has been 15 years since we have heard from Mark Aronson, I. He broke into print recently in a Boston newspaper when he was pictured with two Navy captains in connection with the presentation of a prize. The newspaper account read as follows: "The Planning Officer representing the Commandant of the Fourth Naval District and the Philadelphia Navy Yard presented Mark Aronson, Boston Engineer, with a Certificate of Award which was accompanied with a two-hundred-and-fifty-dollar prize. This award was for 'the Design and Construction of a Tilting Table for Efficient Armor Plate Production.' Mr. Aronson was responsible for the inventive design work in connection with this successful machine. . . . The design of this apparatus solved a most difficult and strategic problem in the manufacture of massive armor plate for battleships. Two of these units have been built for the Navy Department."

Mark wrote: "For no good reason I'm still a bachelor, although my resistance to passing into the hands of a receiver is definitely not what it used to be."

Bill Leach, X, formerly manager of the Mathieson Alkali Works and more recently with DuPont at Niagara Falls, is now production manager of the magnesium division of the International Minerals and Chemical Corporation, in charge of their large plant recently built at Austin, Texas. Concerning his new abode, Bill writes as follows: "Mrs. Leach and I love Texas. It is a grand state with unlimited possibilities. Haven't worked so hard since the last war." — JAMES A. BURBANK, *Secretary*, The Travelers Insurance Company, Hartford, Conn. STEVEN R. BERKE, *Associate Secretary*, Coleman Brothers Corporation, 245 State Street, Boston, Mass.

1917

Bill Sullivan has been discovered by the press, and clippings about him pour in from many quarters. Most recently, the date lines read "Casablanca" or merely "at a North African Port," and it would appear that Bill counts a day as wasted when he doesn't raise at least a couple of sunken French ships. As usual, many of his phrases are inserted verbatim in quotes, and in the last story coming from Africa the news writer remarked: "He is certainly the most popular American citizen of this very large city at the present time." Unfortunately, the activities of other branches of the service are not so free from censorship restrictions as is Sully's salvage work. Slips from the Alumni Office contain numerous address changes spotted with "changed from colonel to brigadier general, changed from major, captain added," and so forth, but it is impossible to include a complete listing in these notes. We invite attention to The Review's regular section entitled "M.I.T. Men at War."

The co-operative secretaryship scheme has worked out marvelously, but without an indexed file of previous notes we cannot be certain that some items have not been previously included. For example, Paul Gardner is back in the Army as a major in the Army Service Forces and when last heard from expected to see exciting scenes in the near future. He added a tempting invitation to visit him in Kansas City after the war or "better still, at my ranch in New Mexico."

Dix Proctor was in Cambridge again recently but came unannounced and unfortunately missed connections with one or two of us who wanted to talk with him. He had written Ted Bernard previously that Nig Sewall seemed to be "in the War Production Board division of Oneida, Ltd., of Oneida, N.Y." As happens so frequently with Nig's activities and discourses, a little explanation or further comment seems to be in order. Dix also reports meeting Gus Farnsworth at a gathering of the New York Railroad Club. He expressed some surprise at Gus's current and active interest in railroading. It will be recalled that he is a partner of Coverdale and Colpitts, the well-known Wall Street firm of transportation and consulting engineers.

Congratulations are hereby bestowed upon a classmate who has assuredly made the most of his background in student publications. Lin Noyes was chosen president of the American Newspaper Publishers Association in New York in April. — RAYMOND STEVENS, *Secretary*, 30 Memorial Drive, Cambridge, Mass. PHILIP E. HULBURD, *Assistant Secretary*, Phillips Exeter Academy, Exeter, N.H.

1918

A few months ago I said that Sumner Wiley was now located in Boston as regional director of the Federal Public Housing Authority for New England. Since that time much has been in the papers about the wonderful job he is doing all over New England. He came to Boston from Washington with a staff of 45 and now has over 400, counting his field organization. His job is to locate housing for the defense workers. The housing ranges from trailer camps and demountable houses to full developments. To date, his organization has completed

1918 Continued

almost 10,000 structures; 500 more are in construction; and about 2,000 more are on the schedule for this territory. Any chance of your getting away for a few days to our reunion, Sumner?

You have all received your reunion notice, with the note from Bill Wills regarding the Alumni Fund. Here's hoping a goodly number can be with us. At the writing of these notes, the return cards are coming in and the percentage at present shows more attending than not. Naturally the old stand-bys are sending their cards in early, but I can also say that word is now coming from persons who haven't attended before. Let's all make our plans to be at Weekapaug from June 18 to 20.

As Bill has told you, our Class is lagging in the amount given to the Alumni Fund, and I back him wholeheartedly in the hope that in this, the year of our 25th reunion, we can really do our part and stand up with the best of them.

At the reunion, we ought to be able to have a full report from Maggie on the organ fund. More than half the money is in, I know, and he is making a personal drive this spring to try to complete it. Anyone who has not subscribed and wishes to do so, send a check to Horace Ford, marked for the organ fund of the Class of 1918, and he will take care of it. This is our anniversary gift to the Institute, but war and circumstances seem to be against us.

Guess Jack Hanley has heard from about all the classmates he wrote to. Won't someone else please try to reach some members of the Class who were in his Course, and send the news along. I feel certain there are many who are doing interesting things in the war effort. Let's hear from you! — GRETCHEN A. PALMER, *Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

1919

The 25-year reunion questionnaires, snapshots, and bonds gained impetus through the second war bond drive during the month of April. Many of the Class sent in both their bonds at one time. Be sure to make out your bonds to the Massachusetts Institute of Technology, A Corporation, Class 1919 Fund, Cambridge, Mass. The committee would appreciate receiving this reunion material as soon as possible.

In a recent issue of the Pure Oil Company's monthly publication is a photograph of Adolph F. Spiehler, with a write-up announcing that he has just been made a member of the refinery control board of the Pure Oil Company. Adolph attended the University of Rochester two years before entering M.I.T., where he was graduated with a degree in Chemical Engineering. He remained at the Institute as an instructor in Chemical Engineering for the year following his graduation. He then joined the Lewis Recovery Corporation of Boston, consulting engineers, and two years later became connected with the Atlantic Refining Company at Philadelphia, doing general process chemical engineering and development work. Adolph joined the Pure Oil Company in 1928 as a development engineer, and later served the company as a chemical engineer in the refining department. For the past five years he has been on the refinery control board.

Golf, fishing and gardening occupy a part of Spiehler's idle hours. His fishing is done in northern Ontario when he can manage it. Flower culture has appealed to him in recent years, but vegetable growing has been more practical of late, although he says his yield so far has not made an appreciable dent in the grocery bill. While in Marcus Hook, Pa., he met Myrtle Kennedy of Nova Scotia. They were married in 1933 and live in Evanston, where Richard, their eight-year-old son, keeps them busy.

W. Roy Mackay, 58 Broadship Road, Dundalk, Md., is assistant superintendent of the Bethlehem Steel Company at Sparrows Point, Md. He has been married since 1920. — George McCarten phoned recently and said that he has been transferred to the American Cyanamid Company, with offices in New York City at Rockefeller Plaza. George is very active working on safety measures for many war plants.

I was having breakfast at Stouffer's across from Grand Central Station, recently, having returned from one of my frequent trips to Washington, when I was very pleasantly surprised to see Timothy Shea. Tim is doing considerable traveling and has a great deal of concentrated constructive war effort on his docket. The last time we ran into each other, we were traveling from Washington to Los Angeles on the American Airlines on what turned out to be a 24-hour trip, as we were both thrown off at Dallas in favor of ferry pilots.

The Baltimore *Sun* recently carried a write-up and photograph of Al O'Donnell as "engineer turned economist." The story read, in part: "Al O'Donnell has been an assistant director of Treasury research and statistics since 1937 and supervises the making of revenue estimates both for the budget bureau of the United States and for the use of Treasury officials and Congressional committees considering revenue tax legislation. He regards his estimates as closely guarded secrets, and never passes them around lightly.

"Born in Massachusetts in 1897, O'Donnell took a Bachelor of Science degree from the Massachusetts Institute of Technology in 1919, engaged briefly in engineering, then turned to economics. He spent a year at Harvard Graduate School of Business Administration, got his master's degree at the University of California at Berkeley and his doctor of philosophy in economics at the University of Chicago. He taught at Chicago and was professor of economics at Iowa State College, then returned East to New York where he engaged in economic research. . . . In 1936 he joined the Treasury Department as senior economist in the division of research and statistics, and since 1937 has been assistant director."

Thomas H. Bott, Jr., 6 Columbia Road, Beverly, Mass., is assistant treasurer of the Beverly Savings Bank. He is also president of the Massachusetts Savings Banks Officers Club, chairman of the Beverly committee on public safety, and a director of the Beverly community fund. Tom married Ruth M. Johnson in 1922, and they have three children: Joan, 16; Thomas, 11; and David, 7. — Jacob Lichter, 2109 Luray, Cincinnati, Ohio, is president and general manager of the Southern Fireproofing Company. He married Jennie Lempert in 1920. Before the war, his recreations were handball and golf.

Karl F. Rodgers phoned recently to inform us that he is mailing in his questionnaire, photograph, and bond. Karl's wife is now working with the Airborn Laboratories at Mineola, L.I., on special war assignments. Karl sees Frederick Given and Webb Patterson frequently. — Adolph L. Muller also called in reference to the purchase of his bond. Adolph is with Halsey McCormack and Helmer, Inc., an architectural firm, at 286 Fifth Avenue, New York.

Arthur H. Blake writes: "When I called on you in December, I had no idea I'd be in the Army now. Since receiving my appointment as a major in the Air Forces on January 21, I have spent six weeks in Florida, two in Washington, and another traveling around the country. If you get lost in the Pentagon Building in Washington and need a guide to get you out, look me up. I am temporarily living with Bill MacMahon '22 in Arlington, Va." Art is with the Army Air Forces Material Command, Washington, and will be glad to have any of the boys look him up.

Edward Scofield, West 450–15th Avenue, Spokane, Wash., raises the point about the practicability of our reunion because of the difficulties of food, lodging, and transportation if the war goes on. He asks if we could afford it if the war is over. The 25-year reunion committee feels that it is a good plan to arrange in advance for our reunion, and if in the spring of 1944 it looks as though a postponement is advisable, it could be considered at that time.

Dean K. Webster is treasurer of the New England By-Products Corporation of Boston, Mass. He lives at Sunset Rock Road, Andover. Dean writes as follows: "I have been a little slow in answering your communication regarding the class 25th reunion. I ordered the bond, and it just came through today. The only outstanding thing connected with my career the last few years is the opening of our large feed-manufacturing plant at Richford, Vt., two years ago. This is one of the best plants in this industry in New England, and it is already running at full capacity on a one-shift basis. We are contemplating a second-shift operation before very long." — With the feed situation gradually getting worse, we are glad to hear that Dean is contributing to the war effort with his large project.

Cutter P. Davis, 19 East Avenue, Springville, N.Y., is president of the

1919 Continued

Winfield H. Smith Company, manufacturers of gears and speed reducers. Cutter married Carolyn Kittinger in 1931. His hobbies are tennis, fishing, squash, and bridge.

Hy Selya, 178 Purchase Street, Boston, wrote to say that he will send in his bond. — Raymond G. Lafean, 1021 East End Avenue, Wilkinsburg, Pa., sent his information sheet and promises the photograph and bonds at a later date. He writes: "From past experience, I know something of the work involved in this undertaking. You and your committee are to be congratulated for agreeing to do it. Occasionally, I meet with the M.I.T. Club of Western Pennsylvania here in Pittsburgh. I know of no '19 men here at the present time, but if there is some way I can help with compilation of statistics, I shall be glad to do so." — Raymond married Edna Ledger in 1926 and has a daughter, Joan, born in 1927, and a son, Edward, born in 1929. He is an insurance underwriter and is president of the American Publishing Company. His hobbies are organizing, systematizing, woodworking, and baseball. The committee appreciates Raymond's offer to assist in the work for the reunion and will certainly call on him in due time.

Lloyd R. Sorenson is cost engineer for Newport News Shipbuilding and Dry Dock Company and is vice-president and general manager of the James River Ship Company, a subsidiary of the former company. Sorenson suggests that the 25-year reunion be held in eastern Massachusetts and that it be a mixed affair. — Carl Louis Svenson, 45 Sheridan Drive, East Milton, Mass., is listed in "Who's Who in Engineering," "Who's Who in Science," and "Who's Who in Massachusetts." He is Associate Professor in Mechanical Engineering at M.I.T. Carl is author of *Problems in Engineering Thermodynamics and Heat Engineering* (with C. W. Berry and H. C. Moore), and does research on thermodynamics and refrigeration.

Ray H. Bartlett has moved from Pittsburgh and is with MacDonald Brothers, Inc., 444 Madison Avenue, New York City. Harold F. Marshall is now a major, with address of Rural Route No. 1, Byron Road, Osborn, Ohio. Francis D. Porcher has moved from New York City to 517 Lenoir Road, Morganton, N.C. Victor N. Samoyloff is with the American Smelting and Refining Company, Apartado No. 22, Hermosillo, Sonora, Mexico. — EUGENE R. SMOLEY, *Secretary*, The Lummus Company, 420 Lexington Avenue, New York, N.Y. GEORGE W. MCCREERY, *Assistant Secretary*, 131 Clarendon Street, Boston, Mass.

1920

Buzz Burroughs is a lieutenant in the Navy, quartered at Newport, R.I., at 24 Old Beach Road. Jim Downey has left New York, for the present at least, and is in Indianapolis at the Indianapolis Athletic Club. Igor Zavarine, who was an ordnance engineer in the Navy Department, Bureau of Aeronautics, in Washington, has become associated with the Brush Laboratories Company, 3714 Chester Avenue, Cleveland. — Bob Bradley is treasurer of the Precision Products Company, Waltham, Mass. His company is up to its neck in war work and has opened a second plant to take care of the increased volume.

K. B. White's unique and remarkable one-room house remodeled from an old commercial garage on the Jersey Palisades overlooking New York was the subject for a pictorial article in the magazine *Pencil Points* recently. K.B. and Mrs. White did the planning and designing themselves. Judging from the pictures, the house would be worth while for any of us to inspect firsthand. It looks as original and distinctive as K.B. himself.

Your Secretary had a very pleasant visit with Leo Kahn at the Hotel Plaza in New York, where the incomparable Hildegarde was playing. Leo is Hildegarde's crack accompanist and arranger, which is quite some job, as anybody who has seen the act will realize. As you can imagine, Leo plays the piano even more brilliantly than he did in the old days. Those of us around Boston may get a glimpse of him soon when they come to the Hotel Copley-Plaza. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

1921

The current Alumni Fund started last April, and your contribution is due, unless you have been an early bird like the 1,130 contributors who averaged $19.75 each in the first 12 days of the Fund. Your subscription to The Review ends with the next issue. The first five dollars of your annual gift will renew your Review subscription and defray Alumni Association administrative expenses. The minimum of $10 which we are all asked to contribute over that amount goes to the Institute. Send your check to Cambridge now to save mailing costs and the few hairs on your Class Agent's head.

Daniel Noce, I, who was promoted from lieutenant colonel to brigadier general last November, is the first of the Class to receive a decoration in the present conflict. He has been awarded the Distinguished Service Medal "for exceptionally meritorious service in planning and organizing the Engineer Amphibian Command." General Noce is a native of Denver, a graduate of West Point in 1917, who served in the last war. As a district engineer, he built sea walls in the Philippines, levees and harbors in Detroit, and had charge of the Passamaquoddy project. In 1940, he took over one of the War Department's biggest peacetime tasks. Then a major, he assumed charge of the United States District Engineers' office in Memphis and evolved new techniques for keeping "Ol' Man River" within bounds. No doubt it was this combination of engineering ability and experience in battling bodies of water which led to his interest in developing amphibious engineering warfare and training infantrymen and engineers in the tactics of whirlwind invasion. On November 7, 1942, when our forces invaded North Africa, it was the then Colonel Noce's men who stormed the shores in amphibian craft and established beach heads. For his successful work in founding this new Army command, which has taken over ship-to-shore offensives formerly left to the Navy and Marines, he was made a brigadier general and decorated not long thereafter. General Noce's wife and two children now make their home in Falmouth, Mass.

Manuel S. Vallarta, XIV and VIII, Professor of Physics at Technology and internationally known for his studies of cosmic radiation, is the recipient of special honors. Val has been granted a leave of absence by the Institute to serve in his new capacity as chairman of the Mexican Council for the Promotion and Coordination of Scientific Research, to which he was appointed by President Camacho. Val received his doctorate in physics in 1924 and has since been made a fellow of the American Physical Society and the American Academy of Arts and Sciences. He has been cited by the Mexican press as an outstanding scientist.

Howard L. Vickery, XIII-A, rear admiral and Vice-chairman of the Maritime Commission, presented the commission's "M" pennant to United States Steel's Federal Shipbuilding and Dry Dock Company on the occasion of the launching of the *General John Pope*, the first troopship of its kind. A week later, Gordon G. Holbrook '10, general superintendent of Federal, played host to the New Jersey Alumni at a double destroyer launching. Among those present were George Chutter, VI-A, Max Burckett, VI, and your Assistant Secretary. The M.I.T. Club of Northern New Jersey has announced that David O. Woodbury, VI-A, writer, historian, scenarist, lecturer, and columnist, will be one of the principal speakers at the spring party.

Richard W. Smith, XII, formerly mineral technologist with the southern experimental station of the United States Bureau of Mines, Tuscaloosa, Ala., has been appointed district engineer for the bureau's fifth district, eastern region, in charge of field work in Alabama and Mississippi. According to a note from Charlie Locke '96, Alumni Secretary, Dick will continue to make his headquarters at Tuscaloosa with Professor Jim Cudworth, XII, who is director of the School of Mines of the University of Alabama. Both of these men owe us letters.

Raymond A. Snow, II, writes from our own Tarheel State to inquire what has been done about Linc Barker's appeal for the purchase of class rings, as noted in the January Review. Since Ray and Linc are the only ones who have shown any interest in obtaining rings, the matter has been postponed until more requests are received. Again we ask that those of you who would like rings write in at once.

A. Abba Orlinger, X and X-A, has brought his history up to date in a letter addressed to Saint. Ab started out as a chemical engineer in the sales department of Grasselli Chemical Company and then became an assistant sales division head. He went to law school, obtained an LL.B. degree and then entered a law office. On

1921 Continued

passing the New York State bar examinations in 1930 and being admitted to practice, he combined law and chemical engineering in association with several patent law firms in New York. Since 1937, Ab has been in Philadelphia as resident patent counsel for Sharp and Dohme. He is married and has two daughters, 18 and seven years old. Ab lives at 6655 McCallum Street, Philadelphia.

Williston Wirt, XV, tops the military section this month as the first of the Class to enter the service as a chaplain. Will was minister of the First Congregational Church of Eugene, Ore. He has been assigned to duty in Arizona. Two new brigadier generals have been added to the list: James E. Baylies, VII, and Daniel Noce, I. For other additions and promotions, see the "M.I.T. Men At War" page. Our statistics now show that over 13 per cent of the Class is in service: 88 in the Army and 29 in the Navy. There are nine generals, or over one-sixth of the total among all Alumni. Colonels are most numerous, one-third of the group holding this rank. In the Navy, we have one admiral of the 15 listed for all Alumni, 4 captains, 10 commanders, and 12 lieutenant commanders. Your Assistant Secretary will welcome news of men in service in order to keep our files and the Institute records correct.

We need your news to keep this column going, and your Fund contribution to continue your Review subscription and to support Technology. Write that check today. — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, Federal Telephone and Radio Corporation, 1000 Passaic Avenue, East Newark, N.J.

1922

Alan C. Johnston is a major in the Ordnance Department. He is somewhere in the Pacific. He wrote on March 20 to extend his best regards to all members of the Class. Unfortunately, he has not seen an issue of The Review for some time so is not completely up to date. Before going abroad, Alan was in the office of Chief of Ordnance in Washington and then at the Elwood loading plant. He is now doing technical work and reports that he is getting along pretty well. — The Secretary extends the best wishes of the Class to Alan as well as to the many others in the armed services.

John O. Bower, manager of the Texas Petroleum Company, Bogota, Colombia, has been in the States on a business trip and has recently returned to South America. — Nicholas Murray Butler, President of Columbia University, has announced the creation of the post of comptroller. The first incumbent is Henry McAlpin Schley. Schley has been on the staff of the university for about a year, having previously been construction manager of Rockefeller Center, Inc.

On a hurried trip to California in March, the Secretary had an opportunity to visit Wes Hammond, who is with Worthington Pump and Machine Corporation in Los Angeles; F. Marion Banks, Vice-president of Southern California Gas Company; and Bryant Essick, Vice-president of the Essick Machinery Company in Los Angeles. Bryant had written us a year ago that he expected to come east for the reunion, but could not because of the conversion of his plant to war activities. Normally Essick manufactures pumps, contractors' equipment, and steam rollers which are in use all over the country. He admits that there have been and continue to be many headaches, but he is staying on top of the job and turning out substantial quantities of war material. He asks particularly to be remembered to the Class.

It is our sad duty to report the death of two of our classmates, former Class President Henry J. Horn, Jr., and Alden M. Hammond. Heinie Horn passed away on April 9. For the past two years he held important posts in the War Production Board in Washington. The Secretary enjoyed a brief visit with him in Washington early this year and found him in his usual energetic frame of mind and apparently in excellent health. He again expressed his deep regret that the war program had prevented his attendance at reunion. He was particularly happy over the telegram which was sent to him from Pine Orchard. Heinie's sudden passing is a severe blow to the Class and to his many friends.

Alden Hammond lived in Cranston, R.I., and was co-owner of the advertising firm, Hammond-Goff Company in Providence. He had been in ill health for two years. The son of a minister, he was very active in church affairs, being a member of various boards of religious education. In addition, he was a director of the Boston Wesleyan Association, a former president of the Providence Methodist Social Union, and a member of the American Legion and the Providence Engineering Society. He is survived by his mother, his wife, three brothers, a daughter, and a son. — CLAYTON D. GROVER, *Secretary*, Whitehead Metal Products Company, Inc., 303 West Tenth Street, New York, N.Y. WHITWORTH FERGUSON, *Assistant Secretary*, Ferguson Electric Construction Company, 204 Oak Street, Buffalo, N.Y.

1923

Ray Bond is still in England, and everything is quiet with the Assistant Secretary and the Acting Secretary. Many changes of address still come through. Most of them are connected with classmates in the armed services. It is rather interesting to note the number of our members who hold high ranks in both the Army and the Navy.

Edward R. Schwarz, a professor at the Institute, is president of the Massachusetts Safety Council. He has obtained considerable publicity by his declaration that "Forty battleships, several hundred destroyers, over 10,000 Flying Fortresses or nearly 200,000 light tanks might have been built with man power lost last year through off-the-job accidents." There is no doubt that much is yet to be accomplished in the prevention of accidents, including those which involve both the lives of workmen and the destruction of property.

By the time you read these notes, Ray Bond will probably have returned from England. He was slated to address the National Fire Protection Association at its annual meeting in Chicago on May 10. — HOWARD F. RUSSELL, *Acting Secretary*, 71 Catlin Avenue, Rumford, R.I. HORATIO L. BOND, *Secretary*, 457 Washington Street, Braintree, Mass. JOHN M. KECK, *Assistant Secretary*, 207 Bloomfield Avenue, Bloomfield, N.J.

1925

You who pick up this issue of The Review and turn to the class notes with the vague hope of finding some '25 news are in for a pleasant surprise. The items follow in approximately chronological order.

The December issue of the *Journal of the Patent Office Society* carried the following: "Louis F. Kreek was appointed to the Board of Interference Examiners, effective May 24, 1942. Mr. Kreek was born in Oregon, Missouri, Oct. 31, 1900. He . . . transferred to the M.I.T. for the 3d and 4th years. He received his LL.B. degree from George Washington University and is a member of the bar of the District Court of the United States for the District of Columbia, of the U.S. Court of Appeals for the District of Columbia and was admitted to practice before the Supreme Court of the U.S. on May 27, 1935. Mr. Kreek entered the Patent Office October 6, 1924. . . ."

From the news bureau of the General Electric Company in October, came this information: "Karl Raymond Van Tassel has been appointed manager of sales of the newly formed integral-horsepower motor section of the General Electric Company's motor division. . . . Mr. Van Tassel, a native of Geneva, N.Y., was graduated from M.I.T. in 1925 and joined the General Electric Company as a student engineer the same year. In 1926 he was transferred to the transformer engineering department, Pittsfield, Mass. . . . In 1932 he was transferred to the fractional-hp motor engineering department, Fort Wayne, Ind., and later became a commercial engineer in this department, and also a staff assistant to the manager of the Fort Wayne works. Since 1940, Mr. Van Tassel has been manager of sales of Lynn Motors at G.E.'s Lynn works."

Alumni Secretary Charles E Locke '96 sends us news of Edith Chartkoff Meyer, III. Mrs. Meyer has had the opportunity of following her chosen profession of metallurgy in many parts of the world, including Spain, the Altai Mountains on the Mongolian border, Quebec, and the United States. After studying metallurgy at Technology, she later became the first woman to receive a degree from the Case School of Applied Science when that school granted her an M.S. in metallurgy. Now Mrs. Meyer is with the Brush Beryllium Company in Cleveland as development engineer in charge of the work on beryllium oxide as a ceramic and refractory.

1925 Continued

An item from the December, 1942, issue of *Ordnance Observations*, the official publication of the St. Louis Ordnance District of the Army, read: "New Chief of the Industrial Division, Lt. Col. George E. Mason, has been writing and placing contracts throughout the St. Louis Ordnance District for the past 2 years. With this appointment he finds that, now responsible for the execution of these contracts, he must reap what he has sown. Col. Mason is a native of Massachusetts and received his degree in Mechanical Engineering at M.I.T. Following graduation he spent two years in the employ of the Multibestos Co. in New England. . . . Later he was affiliated as field engineer with W K M Co. in Houston, manufacturers of oil field equipment.

"Col. Mason was commissioned as a second lieutenant in the Reserve Corps of the Ordnance Department in June of 1925. He requested active duty in the St. Louis Ordnance District in September of 1940 and was assigned as a captain October 8, 1940. Under Col. (then Major) R. J. Hogan he was appointed Chief of facilities section and was promoted to the rank of major January 9, 1941. Later, he became Chief of the Procurement Service and was promoted to Lt. Colonel April 28, 1942. He became a Special Assistant to the District Chief several months ago and served in this capacity until his present assignment. . . . He likes to laugh at his being snared into matrimony the first time he crossed the Mason-Dixon line. His wife, the former Miss Drucilla Butler of Tulsa, recently presented him with a daughter, Marilyn Lois, born Aug. 15, 1942."

From the "Cambridge Rambler" column of the Boston *American*, we learned that: "Lt. Comdr. Arthur F. Morash was promoted to commander on Christmas Day. . . . Comdr. Morash, who saw service in the Navy during World War I, was recalled to active duty soon after Pearl Harbor. . . . For a time he was stationed at the Naval Base at Yorktown, Va. . . . Two and a half months ago he was transferred to the Naval Academy at Annapolis where he now is." His marriage to Rena Burgess Luck was recently reported in these notes.

Mrs. Nicholas A. Draim, of Vincennes, Ind., writes that her husband, Nicholas A. Draim, a captain in the Navy, is now on duty in the southwest Pacific. Nick was a member of XIII-A and received his S.M. in 1926. Major Carlton R. Mabley, Jr., II, is in the office of the Quartermaster General and is living at the Wardman Park Hotel, Washington, D.C. Carlton was a special representative of the Island Creek Coal Sales Company in Huntington, W.Va., before entering the Army.

Frank McGinnis and his wife announce the arrival of a son, Frank Paul, on February 10. They are living in Alexandria, Va. .

A clipping from the Newark, N.J., *Star Ledger* of February 20 read as follows: "George C. Caine has been appointed superintendent of the Bayonne refinery of the Tide Water Associated Oil Co. with headquarters in New York City. A graduate of the M.I.T., Caine joined the Tide Water refinery staff in 1926 as a member of the Research and Development Department. Since 1938 he has been assistant general superintendent of the Bayonne refinery." — HOLLIS F. WARE, *General Secretary*, 3 Aquavia Road, Medford, Mass. F. LEROY FOSTER, *Assistant Secretary*, Room 5-105, M.I.T., Cambridge, Mass.

1926

A welcome letter has arrived from Elton Staples, a major in the Army. He writes: "Here at Fort Monroe we occasionally see some visitor from Cambridge. . . . There are a number of Technology men of other years here. We need only a special visitor or a similar occasion to get us all together at a dinner. I watch the class notes, with great interest always in the items of the men of '26. I recently heard from Bob Rogers, who is a captain. Before going to Africa, he spent some busy weeks in England building airports.

"I had a very interesting nine months as commanding officer of a submarine mine battery here, from which I was transferred to the coast artillery school, department of submarine mining, as senior instructor. My new work is quite interesting. While our department is small, we train officers and enlisted men for all harbor defenses, and keep in close contact with all new mine developments. . . ."

A. E. Cameron, who is deputy minister of mines for Nova Scotia, is chairman of the economic survey committee concerned with the correlated development of the resources of that province, especially during the period of rehabilitation. — Wilfred L. Irvine is chief estimator for Pacific Aviation, Inc., Venice, Calif. — Edmund Capone has been given his majority. — Morton P. Woodason is now a lieutenant commander. — W. B. Millar recently proved himself a first-rate satirist in a review he wrote for the *Engineering and Mining Journal*, taking apart a recent article in *Coronet* entitled "Yours for the Digging" and purporting to explain the mysteries of prospecting. — Alfred H. Dolben is chairman of the real estate brokers' board here in Boston, and at a recent dinner he spoke, along with Governor Saltonstall, Professor Walter C. Voss '32 of the Institute, and others.

Madame Shih-Ming Chu, wife of our classmate General Chu, recently spoke in Boston. General Chu is military attaché to the Chinese Embassy in Washington. — JAMES R. KILLIAN, JR., *General Secretary*, Room 3-208, M.I.T., Cambridge, Mass.

1928

The following notice appeared in a recent issue of the *Saturday Evening Post:* "Alfred Parker Morell, Post author, died March seventeenth in Jefferson Hospital, Philadelphia, following an operation which he had hoped would enable him to get into the Army.

"Mr. Morell, who was thirty-six, and a native of New England, for some years had contributed to the Post and other magazines and was the author of DIAMOND JIM BRADY and LILLIAN RUSSELL — THE ERA OF PLUSH and other biographical works. He was married and lived in Philadelphia."

While he was at Tech, Parker studied architecture and early in his career showed his literary leanings by active participation on the editorial board of *The Tech*. The late beloved Tubby Rogers often spoke of Parker as a very brilliant young writer. All the Class mourns the early ending of a career which had started so auspiciously.

The following is quoted from the *Lockheed-Vega Star* of April 16: "One of the most amazing escapes from death in the annals of aviation was written last week by Col. Ben Kelsey, veteran Army test pilot and the first man to fly a Lockheed Lightning in a record-breaking cross-country flight four years ago. Entrusted with the risky task of testing an experimental control device, Col. Kelsey pointed the nose of his Lightning earthward, 'gunned' it into a screaming terminal velocity dive at a speed approaching that of sound — then tested the gadget — *It failed!*

"Only seconds intervened between him and death. Slapping the emergency canopy release with one hand and unbuckling his safety belt with the other, Col. Kelsey forced himself up into the powerful blast of the slip stream and was automatically thrown clear of the ship. As his 'chute opened and he floated down to earth he saw the plane crash beneath him near Calabasas." — GEORGE I. CHATFIELD, *General Secretary*, 6 Alben Street, Winchester, Mass.

1930

Our best wishes go to Major Charles Small, X, who was married in Washington early in March to Ruth Behrend of that city. Likewise, our congratulations and best wishes go to the many '30 men who have received promotions in the armed forces of the country. Your classmates will appreciate a word or two concerning events of interest, and your Secretary will be more than glad to pass along the information. In this connection Course XVI men will be happy to learn that Bill Driscoll is located in Quincy, Mass., on the staff of the supervisor of shipbuilding. Bill is a Navy lieutenant whose Course XVI training is being used to good advantage.

Your Secretary's offer in the March Review has netted three letters to date. Sol Uman, IV-A, writes from Freeport, L. I.: "I've been reading the news about classmates for many years, but this is the first time I've done any writing myself." Sol was married more than ten years ago to Jean Kozol and is the father of two sons, aged seven and three. He is associated with Madigan-Hyland, consulting engineers in Long Island City. E. L. Pavlo, I, is acting chief engineer of the same company. Al Intriligator, XV, is also living in Freeport and is purchasing agent for a department store in Brooklyn. There are two young Intriligators.

Don DiManni, IV-A, is an Army captain serving as adjutant and intelligence officer at Fort Jackson, S.C. Sol says that

1930 Continued

Don is still a bachelor. He also reports that his last letter from Art Roberts, IV-A, was sent from Springfield, Mass., where Art is manager of a supply house. Art is the father of two children. — Many thanks for that newsy letter, Sol, and keep up the good work!

Jack Bennett, II, who is back in Akron as assistant treasurer of Goodyear Aircraft, has bought a home in Hudson, a suburb 15 miles north of Akron. He reports having seen Ted Riehl, Jim Holden, and Fluque Rowzee, all Course X men with Goodyear. Fluque is stationed in Toronto doing special development work with synthetic rubber. Jimmy has recently returned to work at Akron after a serious illness. Ted's son keeps him busy during his leisure hours, and the Bennetts are trying to survive their first American winter in a number of years. Hank Luykx, I-A, writes of receiving a commission as lieutenant in the Navy's Bureau of Medicine and Surgery. He spent the past winter at Johns Hopkins on research in medical statistics, which he can now use to good advantage in his new post. Hank has two children — a boy five years old and a year-old daughter. — More letters like those from Sol, Jack, and Hank will be welcomed. — PARKER H. STARRATT, *General Secretary*, 1 Bradley Park Drive, Hingham, Mass.

1932

Robert Follansbee and Russell Pratt have been commissioned lieutenants, junior grade, in the Naval Reserve. Leland Burr is a lieutenant with the Bureau of Ordnance, Navy Department, in Washington. George Baker is reported to be a lieutenant with a Marine Corps construction battalion on an island in the South Pacific. Tom Sears, a captain in the Chemical Warfare Service, is public relations officer at the Rocky Mountain Arsenal, Denver. In addition, he is chief of the public safety branch of the arsenal.

From Professor Charles E Locke '96, Alumni Secretary, we learned that Arthur Moy was graduated from officers' candidate school in January and received his commission as a second lieutenant in the Corps of Engineers.

Norman Schulze, assistant to the general manager of the Boston yards, shipbuilding division, Bethlehem Steel Company, received a $500 award in the progress award program of James F. Lincoln Arc Welding Foundation. — Robert Butler has been elected a fellow of the Geological Society of America. Dr. Butler is now on leave of absence from Lehigh University, doing work in Brazil for the Board of Economic Warfare. — CLARENCE M. CHASE, JR., *General Secretary*, 1207 West 7th Street, Plainfield, N.J. *Assistant Secretaries:* CARROLL L. WILSON, 1530 P Street, Northwest, Washington, D.C.; WILLIAM A. KIRKPATRICK, Allied Paper Mills, Kalamazoo, Mich.

1934

A short time ago we received a letter from Bob Roulston. Bob was then a captain in the Air Forces, stationed in New Orleans, and was getting impatient to see active service. More recently word has come to us that he has been promoted to the rank of major and is located somewhere in the Caribbean area. Perhaps his thirst for active service will now be satisfied. Bob had seen Graves Snyder, a lieutenant colonel, who is using his electrical engineering training to good advantage.

It is with deep regret that we announce the death on October 16 of Commander Harry Ensor Hubbard from wounds received in action. Hubbard was graduated in 1925 from the United States Naval Academy, where he was an honor man. Following his graduation, he attended the submarine school in New London, Conn., and then reported for duty at Cavite, P.I. He returned to the Naval Academy in 1931 for postgraduate work and then came to Technology for an S.M. degree. He is survived by his widow, Mrs. Erma D. Hubbard.

Captain John M. D. Heald of Houston, Texas, has reported to the navigation school of the Army Air Forces at San Marcos, Texas. He is commandant of aviation cadets. Heald was originally commissioned in the Field Artillery Reserve. He attended the Command and General Staff School at Fort Leavenworth, Kansas, and has served at Ellington Field, Texas, and at the aviation cadet center at San Antonio. In civilian life, Heald was a chemical engineer for the Humble Oil and Refining Company in Houston. — Captain Proctor Wetherill is doing a fine job for Army Ordnance at Fort Sill, Okla.

At the present time, your Secretary is located in Albany, N.Y., where he is converting a toy-manufacturing plant into war production. While staying in Albany, I have seen Jim Burnham a number of times. It was news to me, and probably will be to most of you, that Jim is the proud papa of a baby daughter, Edith Margaret, who was born on May 1, 1942. Jim is still with General Electric in Schenectady, where he is doing special work on turbines and compressors. — Mr. and Mrs. Carl P. Stratton are to be congratulated on the birth of a baby boy, Bradly Campbell, born on March 3.

Francis Jenkins, an Army captain, is engaged to Anne Russell Mather, daughter of Colonel and Mrs. John Mather. Colonel Mather, a member of the Class of '07, is in the ordnance division of the Watertown Arsenal, and Francis is now chief of the procurement division at the arsenal. — JOHN G. CALLAN, JR., *General Secretary*, 184 Ames Street, Sharon, Mass. ROBERT C. BECKER, *Assistant Secretary*, First Special Service Force, Fort William Henry Harrison, Helena, Mont.

1940

Good old Sedgwick came through with another letter from the South Pacific. There is a boy after my own heart. Even though he's in the thick of things, he manages to get a letter through. Harry wrote: "Your consternation at receiving this is as nothing compared to mine at finding time to use for such a mundane pursuit. You might be interested in a hurried review of our present activities. The southwest Pacific still remains the locale; the temperature, tropical; the food, adequate; entertainment, zero, with minor reservations; and women, nonexistent.

"Occasionally our friends across the way drop by for a visit. For some unknown reason, they almost invariably have only one-way tickets. You should have seen and heard them during the last big 'gam.' It was fun to watch, but more or less annoying to hear. They were zooming and diving through a layer of clouds overhead. A sudden prolonged chatter, and then a deep-throated roar usually marked the beginning of the end. A plume of smoke, a dull thud — and the souvenir hunters got under way.

"One plane landed fairly close to my tent while I was away. There was little left of it but a few scraps, but I managed to salvage some metal parts to use on my next boat, the nebulous plans for which are already forming. I am hoping now for more Zeros to complete my rigging requirements. Professor Owen would be glad to think that I'm still trying to get my boat finished even over here. [Please someone show him this article for Harry's sake.]

"Our area is in one of the many coconut groves. We've cleaned it up till it looks like Memorial Drive, with the exception of the mounds denoting fox holes and slit trenches. Some of the boys have been making stump juice — with disastrous mental effects. Swimming is excellent once one overcomes any reservations concerning such friendly cohorts of Neptune as sharks and crocodiles.

"A couple of the men hunt crocodile in true Technology fashion. A chunk of fresh beef is the bait — filled with an appetizing mixture of unsullied TNT, blasting caps, and lead wire. The beast swallows the beef, someone gives the blasting machine a whirl, and poof! poor little crocodile. Sounds good, but so far our prey has been too wary.

"The Review arrives more or less regularly. Your recent brevity aroused me to this unwarranted pitch of activity. Art McCabe is in Santa Monica, an Air Forces lieutenant."

Bob Stocker was commissioned a second lieutenant in the Ordnance Department on September 5 and married Mary L. Taylor on September 7 in Barre, Mass. On February 1, Bob was made a first lieutenant. He is now a battalion adjutant at Fort Lewis, Wash. — Frederick G. Stroke and Edythe Charlotte Pfander were wed on March 6 in Germantown, Pa. — David Johnstone, a Navy lieutenant, and Katherine Tod were married on the same date.

I have just received a letter from Tom Creamer, who tells of recent visits from Bill White, now a lieutenant, junior grade, at the naval air station in Bermuda; from Alvan Guttag; and from Bob Hess. Just before seeing Tom, Bob had written him a letter, in which he sent the following message: "Haven't seen many of our classmates lately. At Norfolk recently I met Phil Morgan. He's a lieutenant in the Navy Yard there. A few days later, I bumped into Bob Harper at the officer's club. He's a lieutenant at the Navy Yard in Washington, D.C.

1940 Continued

"I am now a full-fledged lieutenant. Maybe I'll be an admiral by next year. Pity the Navy then! All I can tell you about my work is that we are doing our share in the 'Battle of the Atlantic.' We have none of the 'blood-and-thunder' action of the Pacific areas, but our work is just as necessary and often as unpleasant."

After leaving Boston, Al Guttag wrote the following letter to Tom: "When I left Boston and got back to New York, I found I was transferred from IV-F to I-A. Then upon my return to Richmond, I was placed in II-B until August 9. After that, I don't know where I'll be. Right now I'm examining applications on natural and synthetic rubbers and synthetic resins.

"While in New York in February, I saw the Millrose games, with Technology winning its relay race. After the games, I met Oscar and some of the old crowd. Dan Crosby was at the games, but I missed him as he had to go back to New Jersey. Les Corsa was there. He is in the Army Medical Corps, and I understand is now studying at Harvard Medical School. Georgie Clark was also there, and he looked great. He is in the Air Corps and at the time was stationed on Long Island. (He is either a first lieutenant or a captain.) Ed Lemanski also showed up. He is working in Bridgeport, Conn.

"On the way back to Richmond, I stopped off for a day in Washington and literally bumped into Bernie Greenberg. He is a civilian in the Navy Department and is doing fine. Arnie Arch writes that Milt Green is now working for the General Tire and Rubber Company in Akron. He expected to be transferred to Houston, Texas, in May. In New York, I saw Sam Omansky and his wife, Doris. Sam has joined the clan which has started to lose part of its natural head covering. Otherwise he and his wife are looking great and like a very happy young pair. (They have been married about six months.) Sam is now head chemist for John de Kuyper and Son, Inc., and is doing all sorts of work, as their problems are quite varied."

Edith Kingsbury wrote: "Mrs. Samuel Scott gave birth to a daughter, Nancy Scott, on February 6. I received a letter recently from Jean and Martin Rosse announcing the arrival of Suzanne Caroline Rosse on March 18. Jean goes on to say: 'After a magnificent trip to Mexico, we landed in Wilmington, N.C., where we lived for a year. Mart worked in the plant engineers office of the North Carolina Shipbuilding Company as designer, engineer, and supervisor of buildings built in the shipyard. Very recently we moved to Washington, D.C., where he is connected with Cargoes, Inc., under Lend-Lease.'"

Recent announcements in the paper show the engagement of Bill Sweet to Joan Lohman, Bob Castles to Nancy Neuroth, and Captain Thomas Parker Bowman to Sheila Goodall Fraser. — H. GARRETT WRIGHT, *General Secretary*, 1124 Greenwich Street, San Francisco, Calif. THOMAS F. CREAMER, *Assistant Secretary*, Room 3-208, M.I.T., Cambridge, Mass.

1941

A long news-filled letter from Ensign Ivor Collins, somewhere in the Pacific, tells of his activities since last reported in this column. He wrote: "The only '41 man in the vicinity is Dick Levy of XIII-C. He's been made a full lieutenant and is really busy. I see him about once a month. The following '41 data I've gleaned from letters: Congratulations are in order for Bob Montana. On November 29 he married Pat Jones of Jackson, Miss. When he wrote, he was an ensign in the Bureau of Aeronautics in Washington. He said Steve James and Bob Sandt were there too. The last letter from Carl Aronsen came from Los Angeles, where he's studying meteorology. He expected to be commissioned in June. Bill Fox was still with Bethlehem Steel in their shipyard when he last wrote. He reported that George Brown and Tony Fiorentini were there too. Has anyone heard anything from Dick Joyce? If so, let him speak up." Thanks, Ivor.

Digging into the news clippings, we note the engagement of Ensign Pret Gladding and Margaret Waterman of Providence, R.I. Taking the same step was Ensign Jim Gordon, with Jane Hollins of Shippan Point, Conn. A particularly odd announcement was that of the engagement of Ensign Varney of the Naval Reserve and Lieutenant, junior grade, McClure. However it may be, the man in the picture is Harlan McClure of George Washington University and the Institute, and the young lady is Virginia Varney of Washington, D.C. Margaret Snow of Saugus is engaged to Captain Arthur Gardiner Walsh of the Army Air Forces.

The promotion of Harry Wasserman to the rank of first Lieutenant was noted in a Salt Lake City paper. A note has been received telling us that Otto Zmeskal, former assistant professor of metallurgy at the Illinois Institute of Technology, is now research metallurgist of the Universal-Cyclops Steel Corporation, Bridgeville, Pa.

News of one of our co-ed classmates came from sunny California from Mrs. Abbott Goldberg, or more familiar, Barbara Laven of Course XV and ye textile lab. Barbara has moved to the West Coast with her Army lieutenant husband and is busy applying the Institute's courses in textiles to the consumers' division of the Office of Price Administration. — Your Secretary received an invitation to the wedding of Luke Hayden to Dorothy Karb on May 1. Wish we could have attended, but New York was too far off. Our best wishes are herewith offered.

The following interesting note from Alan Baum gives his recent activities. "Started work for the Hercules Powder Company, doing research at the experimental station in Wilmington, Del. After one year, I was transferred to the Radford Ordnance Works in Virginia. I am now a shift supervisor in the acid laboratory. Guess I am one of the few boys in our Class who is still single. [You are wrong there, Alan.] There are no other '41 men here — at least I haven't run into any." Those of you in the vicinity should look Baum up.

The two most important bits of news from your Boston Secretary this month concern the two Robert W. Blakes. Captain Robert Wilson Blake, Jr., was wounded in Tunisia, received the Purple Heart, and returned to action. This news was received from R. W. Blake, Sr. Such letters from parents are greatly appreciated.

Robert Wallace Blake wrote a grand newsy letter of his contacts with wandering Beavers. He is working for Pan American Airways, and is located in the New York City office. Sherm Crites is with the same company, located at La Guardia Field. He commutes to his home and year-old baby on Long Island. Jim Rea is another Pan American man — a pilot in the Pacific division.

Pillsbury is still with Fleetwings, but according to Bob is spending his spare time commuting to Boston with something special in mind. Frank Mayer, at last report, was working for Consolidated Aircraft in California. Harry Heimer also worked in California, but he has been called into active service and has joined the gang at Wright Field. Preston Gladding has joined the Navy, and last we heard was taking a training course at Dartmouth. Knut Johnsen has joined up with the Royal Norwegian Air Force in Canada. Our last report says that he is waiting for a visa to cross the border. Another Norwegian member of our Class, Rasmus Figenschou, is also in the Royal Norwegian Air Force, at present stationed in New York, as is Nils Rosenberg '40.

In May, Larry Turnock, still with the Chemical Warfare Service, was married to Jane Hunter in Cleveland. Another piece of good news is the engagement of Carl Goodwin to Marie Folberth, Bill's sister. Carl is with the Aluminum Company of America. John Sexton will be married to Margaret Millane on June 26. Don Howard has returned from parts unmentionable on an extended sick leave. He is living at home in Winchester until he can return to action.

Many members of the Class are doing their part in the Institute's great war effort. Vineyard, Charlie Peck, and Al Bowker are usually to be found somewhere in the buildings. Nat Rochester was here until his recent marriage to Ruth Bartlett, at which time he began work at the Sylvania Electric Products plant in Salem.

There has been a rumor that I am in Hawaii. Let me state that I haven't been out of New England for over a year. Drop a line to your Secretaries so we can pass your news along. — STANLEY BACKER, *General Secretary*, 46 Bicknell Street, Dorchester, Mass. JOHAN M. ANDERSEN, *Assistant Secretary*, Room 12-184, M.I.T., Cambridge, Mass.

1942

From Camp Murphy, Fla., comes word of Harold Reed, a lieutenant in the Signal Corps. He wrote: "Some of our work is field stripping of weapons, running the obstacle course, bayonet drill, lectures

1942 Continued

and discussion on camouflage, gas defense, and technical study. After this week, much of my work will be tennis and swimming during the free mornings. Between good food and all of this exercise and sun, I'm getting healthy, shaking off the effects of the eight months in Boston to which the Army sentenced me. Dave Baltimore and Ervine Rips are also here. John Quinn last wrote from San Francisco, but as for the others, I just haven't heard." Neither has your Secretary heard.

From Curt Buford comes a letter with an Army post office number. Curt, now a first lieutenant, is very busy working on the railroad to Alaska. He expects to hear from many of the Course I lads. He wrote: "After a month at Belvoir, I went to headquarters of the Military Railway Service in St. Paul and was there training troops for three months. For the following five or six months, I was in transportation as an assistant to the department head. He had me inspect the railroads in St. Paul for two weeks, and then sent me to Camp Claiborne in Louisiana for a month. I worked on plans and training for a while, and finally gave basic training to about two dozen officers. I got tired of being in the office and asked for a transfer to this unit in the field."

Branson Smith, working in the Wright Brothers Wind Tunnel for United Aircraft research, surprised his boss and friends not so long ago by asking for a week or so off. Seems that he wanted to get married. The woman in the case was (maybe still is) librarian of the Aeronautical Library. Smitty has a co-worker who answers to the call of Jake Shaw. Not to be outdone by Smitty, he made a deal with Muffin Mangan to hitch both their wagons to the same star. Unfortunately, the couple must wait until June, when Muffin will pull out of Simmons (not the mattress).

Dave Greenberg is punching a clock at the Naval Aircraft Factory in Philadelphia. He is an ensign and is known as an assistant catapult officer. He enjoys the work, partly because he goes up on flight tests quite often and is connected with an active test group. Ensign George Hart is also working at the same factory, but he is mainly concerned with production.

From the Boston *Globe* of March 19 comes the following: "The people who impressed us most in the conquest of Gafsa were the fellows whose job it was to detect enemy mines and dig them out so the Army could pass. The leader of the outfit we watched was Lieutenant Thomas Crowley of Cambridge, Mass.

"He was carrying one of those long-handled frying pans which are used as detectors. Now and then he would stop and say: 'Here's another,' and up would step his helpmate. . . . Then this overworked citizen would produce his bayonet, dig deeply into the ground, and lo and behold, there would be a mine. . . . This gang has outdone thousands of Axis mines along the Feriana-Gafsa road. . . ."

Also from Africa comes word of the death of Charles F. Kelley, Jr., who was a captain in the Corps of Engineers. Charlie, whose career in the Army and in the African campaign was a brilliant one, was killed in action on March 9 in Tunisia. Charlie had been decorated with the Silver Star for gallantry in action under fire. Previously he had been cited for his work in laying out objectives in sand on the transports. The sand maps were studied by officers and troops before they started the landings.

Charlie received his commission as a second lieutenant at Fort Belvoir right after graduation. While there, he was married to Elizabeth Lyons. He was sent to England with the combat engineers, and on arrival he was promoted to the rank of first lieutenant. To the Course I lads, the Delts, and everyone who knew him, his death is sad news indeed. Both Charlie and his work were always outstanding, but it will be Charlie as we knew him that will be missed the more.

Arthur Covitt, home on leave in Bridgeport, Conn., a short while ago, has been graduated from the Signal Corps officers' candidate school at Fort Monmouth, N.J. Carl McGinnis is now at Pensacola, Fla., putting on the finishing touches toward becoming a flying ensign. Johnny Ewing, an ensign, is continuing naval schooling at Technology and may be found almost any week end somewhere in the vicinity of 28 The Fenway, with Shep Tyree, Mrs. Ewing, and Barbara Jones. Word comes that Charlie Smith and Carl McGinnis visited this group recently. — A co-ed classmate, Frances Ross, married Joseph Kaplan, who may be found at the College of Physicians and Surgeons, Columbia University.

Let's have a letter or a post card from each and all of you. — FREDERICK W. BAUMANN, JR., *General Secretary*, Orchard Lane, Golf, Ill. KARL E. WENK, JR., *Assistant Secretary*, The Graduate House, M.I.T., Cambridge, Mass.

1943

Members of the advanced Reserve Officers' Training Corps have been advised to go into active duty. So Stan Roboff, Johnny Harsch, and your Secretary went off to be made privates. We went up to Fort Devens with the Enlisted Reserve Corps lads in the Class of 1944. The excitement is now all over, however, and we are clothed in olive drabs, drawing $50 a month, and have free mails. All those members of the Class still at the Institute and not originally in the Enlisted Reserve Corps either have made application to the Navy for commissions or have been to the local draft board and are to be formally inducted into the Army as privates during the next few weeks. In June, we shall be sent to officers' candidate schools. Talking about O.C.S. makes me think of a letter which Stan Warzeski wrote to Major Wagner at the Institute. Stan says that Army life in Aberdeen is a lot of work and no play.

Frank French and Bill Selke have applied to the Navy for commissions. They are confident that the prospect of adding two more Technology men from the Class of 1943 (plug) to the ranks of the Navy will be sufficient to make them admirals shortly. When they get their orders, they expect to report to Fort Schuyler in New York. Bob Maxwell and Malcolm Walker have reported to that station for induction this month. I am expecting a letter from Bob telling me how the Tech contingent is doing there.

Cal Dunwoody, who is in the American Field Service, has finally left these shores for destination unknown. He is a group leader, and according to Dick Haas who saw him in New York just before he got away, he is full of life and glad to be doing something useful at last. This makes me think of Dick Haas and his future. He will leave his job at the Institute very shortly and will join the Army Air Forces.

Hans Haac was in Boston recently. He is now with the Royal Typewriter Company in Hartford, Conn. Occasionally he sees Larry Stewart, now an ensign in the Navy, who is working at one of the aircraft engine plants in that city. Wallace Dunn is with the Douglas Aircraft Corporation in Santa Monica, Calif., and Arthur Karnuth is in Miami Beach at the officers' candidate school of the Army Air Forces.

George Feick is back to work again with Arthur D. Little in Cambridge. He had been sick and went home for a couple of weeks. He and Chris Matthew are with the same organization. I saw Chris a few weeks ago, and he wanted to be remembered to the Class via this column. — Harry Ottinger is with a synthetic rubber plant in Louisiana, and has become an essential member of the plant personnel.

Martin Winter wrote me a long letter telling all about his life in Bound Brook, N.J. He is with the Calco Chemical division of the American Cyanamid Company in that city. Work is really interesting in this plant, where he is a student engineer, for he says, "Most of the time I have been designing equipment, but I have also been installing chemical apparatus, and repairing same." He asks if there are any of the lads in his part of the world. Offhand I can think of Bill Franklin and Barrett Russell, who are with Standard Oil.

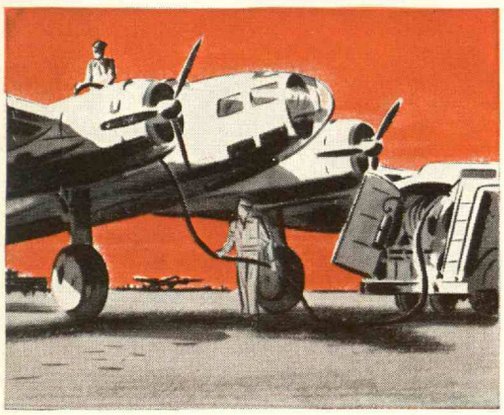
The wedding of Bob Castles and Nancy Neuroth of Maplewood, N.J., was planned for May. Francis Wadsworth, now a lieutenant in the Army, and Inelda Thourot were married in Union City, N.J., on March 8. They are now living in Alexandria, Va. — Ed Cahill and Helen Hughes planned their wedding for April. Ed was graduated at the end of March from the midshipmen's school at Notre Dame. Henry Dahmer is engaged to Elvia LeCain. Henry is now a corporal at Camp Sibert, where he is taking special training. From Rochester, N.Y., word comes that John Guarrera and Josephine Ferrarra were married on February 6. They are now living in Cambridge, Mass. In Boston, Tom Dolan and Anne Macdonough are engaged, as are John Scott and Elizabeth Bell. Congratulations and the best of luck to all. — CLINTON C. KEMP, *General Secretary*, The Graduate House, M.I.T., Cambridge, Mass.

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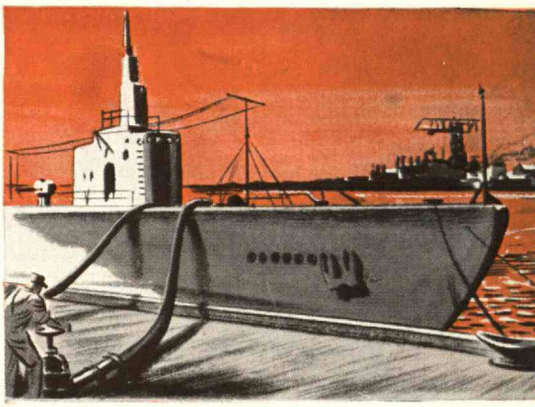
The entire mechanical rubber industry is applying its collective ingenuity, experience and skill from laboratory to shipping platform with results which, at times, may look like miracles to anyone unfamiliar with the sustained research which is an inherent part of the story of Rubber.



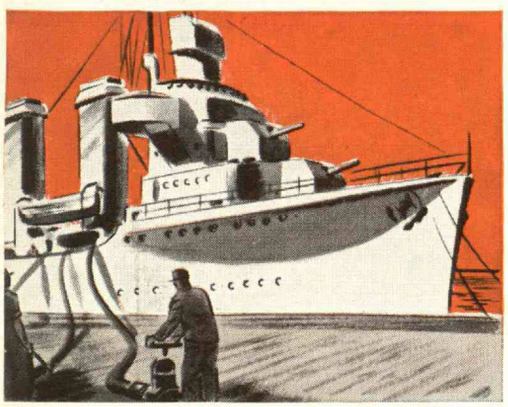
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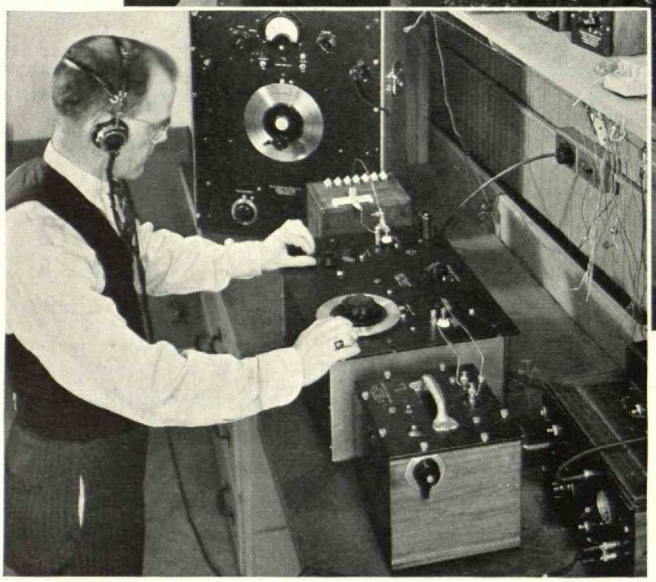
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